

SITE: 61 Industrial Park  
BREAK: 2.11  
OTHER: \_\_\_\_\_

**ON-SCENE COORDINATOR REPORT**

2 11 -0001

**61 INDUSTRIAL PARK SITE  
MEMPHIS, SHELBY COUNTY, TENNESSEE**

**Volume I  
Sections 1 - 6, Appendix A**

**EnSafe Project No: 2249-002**

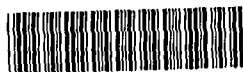
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**May 2, 1997**



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**EXECUTIVE SUMMARY**

**Site:** 61 Industrial Park Site

**Location:** Memphis, Shelby County, Tennessee

**Project Dates:** April 18, 1995, to January 31, 1997  
**(Fieldwork)**

**Description:** Between 1956 and 1973, the site was owned by Pace Corporation, which manufactured aerial flares, artillery fuses, and various ammunition components. In 1973, the site was sold to 61 Industrial Park, which stored salvage material on the property.

In November 1993, the U.S. Environmental Protection Agency (EPA) conducted a preliminary investigation at the site. EPA reported finding corroded or ruptured barrels leaking unidentified materials, waste oil, solvents, paints, batteries, contaminated sediment in onsite lagoons, and various ordnance, among other things.

A Potentially Responsible Party cleanup began April 18, 1995.

**Hazardous  
Materials:**

Drums containing paints, solvents, acids, bases, cyanides, waste oils, and other chemicals.

Soil contaminated with heavy metals and petroleum products.

Lagoon sediment contaminated with heavy metals. Underground storage tanks. Abandoned plating line and associated wastes.

Mercury batteries, slag, tankers containing roofing tar, and asbestos.

**On-Scene  
Coordinators:**

John F. Nolen, Dora Ann Johnson

**Removal  
Contractors:**

Environmental Safety and Designs, Inc.; ENSR, Inc.; Laidlaw Environmental Services, Inc.; and Murphy Environmental Services, Inc.

**Project Costs:**

Since issuance of the Unilateral Administrative Order (UAO), David Lazarov and his subsidiaries have expended \$1.25 million, and United Technologies Automotive (UTA) has expended approximately \$2.5 million on activities pursuant to the UAO. This does not include costs expended under the Administrative Order of Consent.

## **1.0 INTRODUCTION**

### **1.1 Description and History**

The 61 Industrial Park site at 5607 Highway 61 South in Memphis, Tennessee, occupies approximately 97 acres near the Tennessee/Mississippi state line in southwest Shelby County. It consists of gently rolling terrain with fairly dense vegetation. Figure 1 is a vicinity map. Seven lagoons and numerous buildings are onsite. Figure 2 is a site map. In addition, salvage material is staged throughout the site. Site access is controlled by a 6-foot cyclone fence around the perimeter of the developed section.

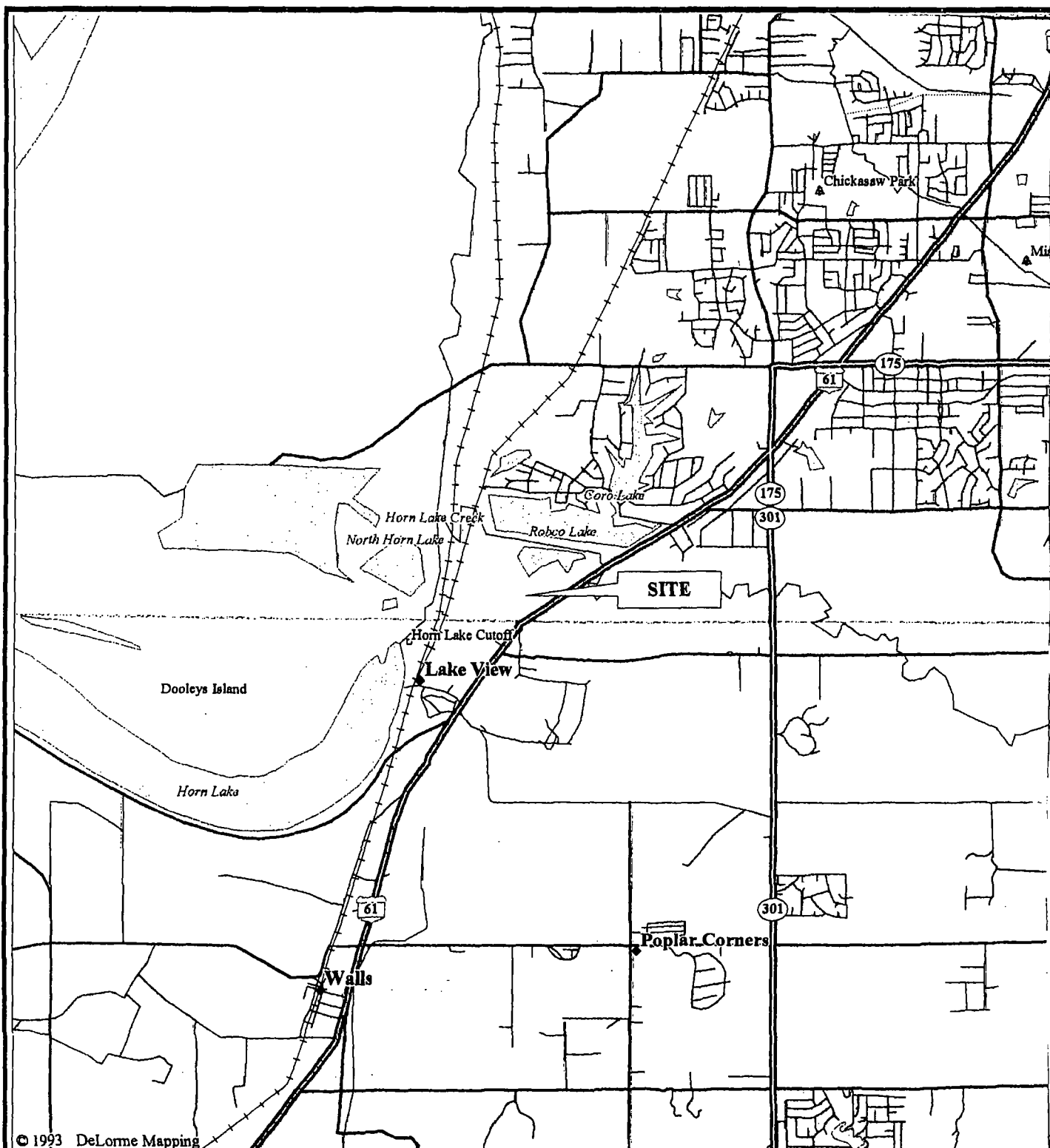
Pace Corporation owned the site between 1956 and 1968. Pace conducted pyrotechnics operations that involved fabrication and assembly of artillery fuses, artillery flares, primers, and various components of ammunition. In 1968, Pace was sold to Ambac Industries, Inc. Operations continued until the site was sold to 61 Industrial Park, owned by Mr. Bennie Lazarov, on April 30, 1973. On July 14, 1978, Ambac Industries was merged into UTA Corporation, a wholly owned subsidiary of United Technologies Corporation. Between 1973 and the present, the site was used as a salvage yard by the property owners and leased to various businesses, such as a worm farm, a school for truck drivers, a Special Law Enforcement Academy that trained security guards and conducted war games, and a junk dealership.

### **1.2 Investigations**

In November 1993, U.S. Environmental Protection Agency (EPA) Region IV conducted a preliminary investigation at the site. EPA's preliminary assessment of the site identified metal and organic contamination, explosives, slag piles, waste batteries, and waste-containing drums, in addition to contaminated sediment in the onsite lagoons.

In November 1994, EPA's Technical Assistance Team (TAT) contractor, Roy F. Weston, Inc., of West Chester, Pennsylvania, and the Lazarov Brothers' contractor, Environmental and Safety Designs, Inc. (EnSafe), of Memphis, Tennessee, performed a sampling investigation onsite to further characterize the extent of contamination. Soil, sediment, and surface water were sampled by the TAT during this assessment. EnSafe sampled groundwater from a potable water well onsite. In addition to a previously existing well with an unknown installation date, two additional water wells were installed, one in 1963 and a 388-foot well in 1967. The well with an unknown installation date and the well installed in 1963 were subsequently filled in 1991. The remaining 388-foot well was the object of this sampling event. No contamination was detected in this sample. Copies of the analytical results are in Appendix A. As a result of these assessments, EPA issued a Unilateral Administrative Order (UAO) for removal response activities. A copy of the UAO is included in Appendix B. The Administrative Order of consent (AOC) named UT Automotive, Inc., and Mr. David Lazarov, along with his subsidiary companies, as potentially responsible parties (PRPs).





Scale 1:62,500 (at center)

1 Miles

2 KM

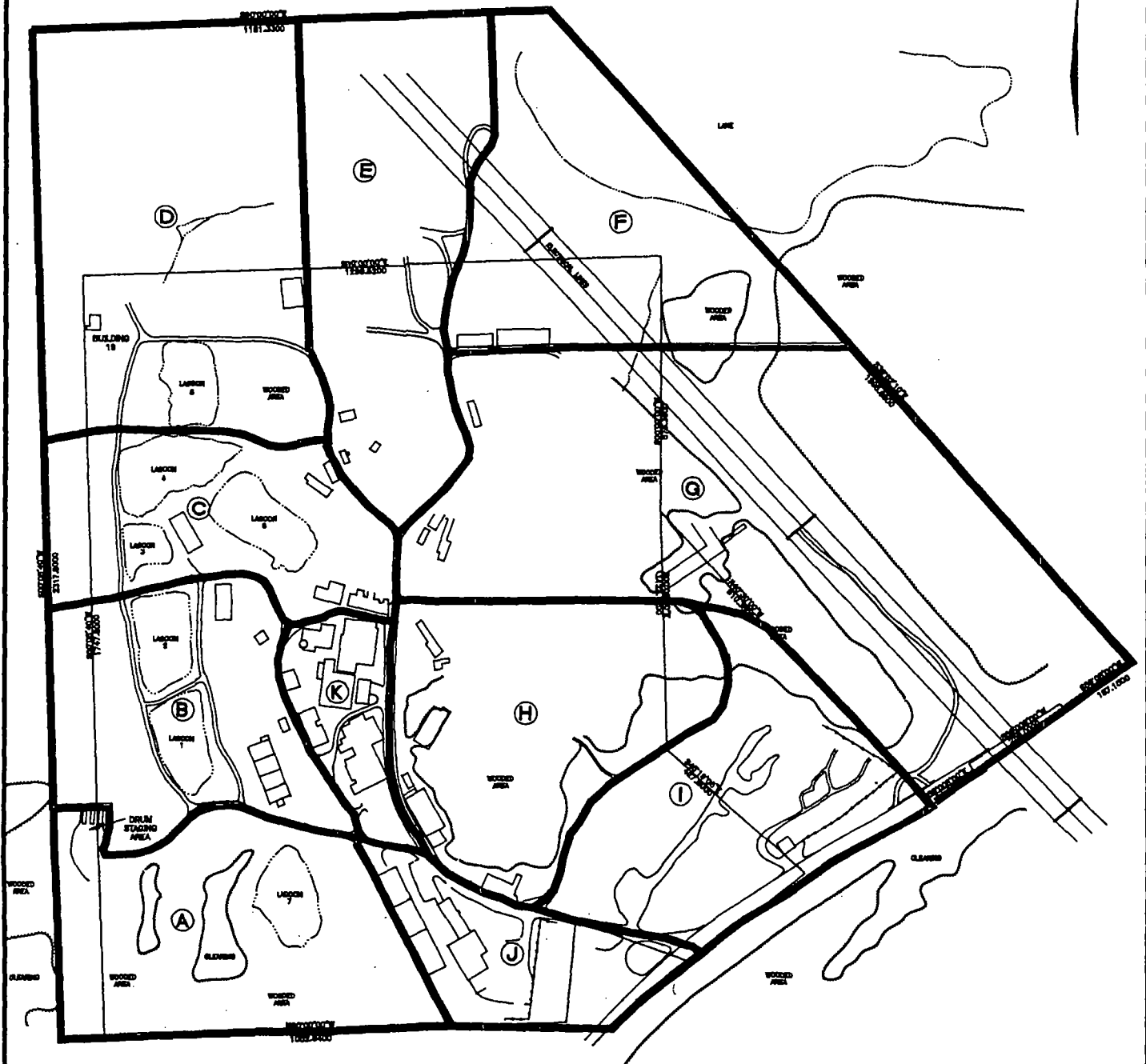


**EN SAFE**

800-588-7968  
 MEMPHIS, TENNESSEE  
 CHARLESTON, SC / CINCINNATI, OH / DALLAS, TX / JACKSON, TN / KNOXVILLE, TN /  
 LANCASTER, PA / NASHVILLE, TN / NORFOLK, VA / PENSACOLA, FL / RALEIGH, NC /  
 COLOGNE, GERMANY

FIGURE 1  
 VICINITY MAP  
 61 INDUSTRIAL PARK  
 MEMPHIS, TENNESSEE

DWG DATE: 03/21/97 DWG NAME: BOARD



### LEGEND

- ZONE DESIGNATION LINE
- ROAD
- SURFACE WATER
- FENCE

350 0 350  
SCALE FEET

**EN SAFE**

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MEMPHIS, TENNESSEE  
CHARLESTON, SC; CINCINNATI, OH; DALLAS, TX; JACKSON, TN; KNOXVILLE, TN;  
LANCASTER, PA; NASHVILLE, TN; NORFOLK, VA; PENSACOLA, FL; RALEIGH, NC;  
COLOGNE, GERMANY

FIGURE 2  
SITE MAP  
61 INDUSTRIAL PARK  
MEMPHIS, TN.

DWG DATE: 03/10/97 DWG NAME: STST2249

Table 1 lists analytical parameters designated by EPA, and the removal cleanup levels established in the UAO.

**Table 1**  
**Soil Parameters and Removal Cleanup Levels**

<b>Parameter</b>	<b>Cleanup Levels (parts per million)</b>
Total Petroleum Hydrocarbons (TPH)	100
Cadmium (Total)	60
Chromium (Total)	400
Chromium VI	250
Lead (Total)	500

## **2.0 REMOVAL ACTIVITIES**

### **2.1 Introduction**

The responsible parties submitted qualifications of their chosen consultants/contractors, and approval was granted. The Lazarov Brothers chose EnSafe, and UT Automotive chose ENSR of Florence, Alabama. William T. Blasingame of EnSafe was chosen as site coordinator through whom all correspondence with EPA from either party would proceed. A work plan and health and safety plan were submitted to EPA in February 1995, and subsequently approved. Removal subcontractors chosen by ENSR and Lazarov Brothers were Four Seasons Industrial Services, Inc., of Greensboro, North Carolina, and Laidlaw Environmental Services, Inc., of Houston, Texas, respectively. The second phase of removal activities for the Lazarov Brothers was performed by Murphy Environmental Services of Memphis, Tennessee. A photo log of all removal activities is included as Appendix C.

### **2.2 Ordnance and Explosive Waste Sweep**

An ordnance sweep was supervised by Jim Noles of Four Seasons. All areas and structures inspected by Four Seasons were deemed void of all ordnance and explosive waste (OEW) except Building 19, which contained magnesium powder that was a by-product of cutting and coating magnesium ingots. EnSafe contracted EOD Technologies, Inc. (EODT), Knoxville, Tennessee, to inspect this building and the material inside. The magnesium powder was found not to be shock-sensitive, and EODT collected eight samples. Six of the samples were analyzed for percent magnesium and two composite samples were analyzed for corrosivity, flash point, reactive sulfide, reactive cyanide, and total petroleum hydrocarbons (TPH). Analytical results are in Appendix A.

A total of 294 drums (20- and 30-gallon) containing magnesium were in Building 19. EODT deemed Building 19 void of all OEW and safe to enter. On July 18 and 19, 1995, the magnesium was transferred from the 20- and 30-gallon drums to 85, 55-gallon, U.S. Department of Transportation (DOT)-approved drums for shipment to the approved recycler, Remacor, of West Pittsburg, Pennsylvania. The drums were marked with the proper shipping name, identification number, consignee name and address, and a "flammable solid" label was attached to each drum. A letter approving transport of the magnesium to Remacor in West Pittsburg, is included in Appendix D.

On August 1, 1995, the 85 drums were loaded onto an M.S. Carriers' freight van for shipment to Remacor. The total weight of the shipment was approximately 10,625 pounds. The freight van was sealed with seal No. 0178994, and marked with "flammable solid" placards. EnSafe provided the driver with the appropriate DOT emergency response guidebook page and the shipping paper. A copy of the shipping paper is included in Appendix E.

### 2.3 Lagoons

As part of the Removal Action, ENSR conducted a lagoon investigation, which consisted of the following activities:

- Sampling and analysis of sludges and underlying soils in each lagoon.
- Sampling and analysis of the surface water in each lagoon.
- Installation of five groundwater monitoring wells and sampling and analysis of the groundwater from each well.
- Sampling and analysis of sediments from locations downstream of the lagoon surface water discharge.

ENSR summarized the activities and findings associated with the lagoon investigation and characterization in the Removal Action Plan dated June 1995 (ENSR Document No. 6916-133-600) incorporated herein by reference. The Removal Action Plan was submitted to the EPA and the State of Tennessee in June 1995.

Once the lagoon water, sludges, and underlying soil were characterized, ENSR prepared a Streamlined Feasibility Evaluation to determine the optimum removal action alternative. The evaluation was submitted to EPA as part of the Removal Action Plan. The removal action alternative selected consisted of onsite solidification/stabilization of the lagoon sludge, followed either by onsite containment or offsite disposal at an approved landfill.

### **2.3.1 Storm Water Diversion Ditch**

To restrict additional flow of surface runoff into Lagoons 1 through 5, a drainage ditch was constructed around the lagoon periphery. The storm water diversion ditch was designed for a 10-year storm event using the rational method. The drainage areas were defined from the following U.S. Geological Survey Quadrangle Maps: Lake Cormorant, Horn Lake, Southwest Memphis, and Fletcher Lake. Appropriate runoff coefficients were assigned for each area based on slope and vegetative cover. The design of the ditches was based on a basic trapezoidal section with side slopes of 1H:1V and a 4-foot wide base. The depth of the channel varied from 2.5 to 5 feet. The slope of the channel varied from 0.0015 feet per foot (ft/ft) to 0.009 ft/ft. The ditch was designed to keep the velocity of the water between 3 to 5 feet per second to prevent excess erosion of the channel. The placement of the ditch was finalized after topographic mapping was completed. The temporary ditch discharges directly to a stream north of Lagoon 5. To prevent excessive sedimentation in the ditch, graded rock filters were constructed at regular intervals.

### **2.3.2 Sludge/Soil Stabilization**

#### **Treatability Study**

ENSR conducted a bench-scale treatability study in September 1995 to determine the optimum recipe for achieving sludge stabilization and solidification. Representative samples collected from all lagoons were combined into a composite sample for stabilization. In addition, a sample of sludge from Lagoon 6 was also tested to confirm the treatability results on the sludge with the most elevated contaminants. The results of the study indicated that a 10% mix of lime kiln dust (LKD) would meet the project leaching criteria and an additional 5% cement would meet the strength criteria. Due to the difficulties in achieving thorough mixing of a 10% admixture, ENSR and UTA decided to use a 20% mix of LKD and 5% mix of cement. This ratio met both the strength and chemical criteria with an acceptable degree of conservatism.

Results of toxicity characteristic leachate procedure (TCLP), synthetic precipitation leachate procedure (SPLP), and volatile organic compound (VOC) analyses conducted as part of the study are summarized in Table 2. The laboratory reports are included in Appendix A.

**Table 2**  
**Bench-scale Treatability Study Analytical Results**  
 (in parts per million)

Sample	Total (6010A)		TCLP (1311/6010A)		SPLP (1320/6010A)		Total (8240)
I.D.	Cadmium	Chromium	Cadmium	Chromium	Cadmium	Chromium	VOCs
36	543	449	0.10 U	0.50 U	0.05 U	0.10 U	No volatile constituents were detected in any of the samples.
6-36	777	289	0.10 U	0.50 U	NA	NA	
32	543	449	0.10 U	0.50 U	0.05 U	0.10 U	
6-32	777	289	0.10 U	0.050	NA	NA	

**Notes:**

Sp 36 (composite of lagoons 1-6) was stabilized with 20% LKD and 5% Portland cement (PC).

Sp 6-36 (composite from lagoon 6) was stabilized with 20% LKD and 5% PC.

Sp 32 (composite of lagoons 1-6) was stabilized with 20% LKD.

Sp 6-32 (composite from lagoon 6) was stabilized with 20% LKD.

U — Not detected; preceding number is the reported limit.

NA — Not analyzed due to insufficient sample quantity.

After the optimum recipe was determined by the treatability study, a pilot-scale demonstration was planned and conducted within the confines of Lagoon 6. The sludge in Lagoon 6 was consolidated in the north end in preparation for full-scale mixing. Clean bottom was confirmed by sampling and analysis in the south end of the lagoon, facilitating the laydown area from where the pilot demonstration was staged. An area 60 feet long by 15 feet wide by 3 feet deep was measured and diked to create a holding cell for the mixing activities. The waste had a specific gravity of 1.36; 96 cubic yards (110 tons) of waste were placed in the cell. A 20% dose of LKD was applied to the waste and blended therein until the mixture appeared to be homogeneous (the process hereafter referred to as preconditioning). After 24 hours of curing, the preconditioned material was removed from the mixing cell and spread to create a 12-inch thick lift of material. Based on the original weight of the sludge prior to preconditioning, a 5% dose of Portland cement (PC; weight:weight basis) was applied to the entire surface area of the lift and mixed thoroughly with a pulvimixer. The treated material was then compacted and left in place for subsequent testing.

Samples for analytical testing were collected 24 hours after the preconditioning, but before and after adding the PC. Table 3(a) presents results from three samples of untreated sludge collected at the time of the pilot test. Tables 3(b) and 3(c) summarize the analytical results of the pilot

study. Results supported the findings of the bench-scale test, indicating that a mixture of 20% LKD alone, and also with a 5% PC addition would immobilize the constituents of concern to meet project criteria.

**Table 3(a)**  
**Analytical Results of Untreated Sludge Samples Collected for the Pilot Stabilization Test**  
 (in parts per million)

Constituent	UT-1	UT-2	UT-3
Total Cadmium	131	93.6	235
Total Chromium	92.7	50.3	112
TCLP Cadmium	6.2	2.6	9.3
TCLP Chromium	0.50 U	0.50 U	0.50 U

**Note:**

U — Not detected; preceding number is the reported limit.

**Table 3(b)**  
**TCLP Metals Analytical Results of Pilot Stabilization**  
 (in parts per million)

Constituent	PCS-1	PCS-2	FMS-1 and FMS-2*	FMS-3 and FMS-4*
	Preconditioned samples treated with 20% LKD, but not PC		Final mixture samples treated with 20% LKD and 5% PC	
TCLP Cadmium	0.05 U	0.05 U	0.05 U	0.34
TCLP Chromium	0.10 U	0.10 U	0.10	0.10 U

**Notes:**

\* — FMS-1 and FMS-2 are from the same location, and FMS-3 and FMS-4 are from the same location.

U — Not detected; preceding number is quantitation limit.

**Table 3(c)**  
**Volatile Organic Constituent Analytical Results of Pilot Stabilization**  
(in parts per million)

Constituent	FMS-1 and FMS-2*	FMS-3 and FMS-4*
	Preconditioned samples treated with 20% LKD, but not PC	Final mixture samples treated with 20% LKD and 5% PC
2-Butanone	0.048	0.010 U
Toluene	0.042	0.012
Xylenes	0.009	0.005 U

**Notes:**

- \* — FMS-1 and FMS-2 are from the same location, and FMS-3 and FMS-4 are from the same location.
- U — Not detected; preceding number is reported limit.

### Full-Scale Stabilization

Temporary access roads were constructed to each lagoon to permit earth-moving equipment to access the lagoons. Sludge from Lagoon 5 was transferred to Lagoon 6 for preconditioning with the Lagoon 6 sludge. Stabilization agents were transported to the site and stockpiled in each lagoon (except Lagoon 5); the specified volumes of reagents (based on sludge volume, as determined by depth and area, and then converted to mass based on specific gravity) were dispersed throughout the lagoons using tracked excavators. In Lagoon 6, where the sludge was excavated and consolidated within the lagoon, the depth of contamination was assumed to be 6 inches greater than observed in order to ensure that all residuals were treated.

After application of the 20% LKD (weight:weight basis), the sludge and soil were mixed using a trackhoe. Mixing continued until the blended materials appeared homogeneous. For quality control purposes, some treated wastes were sampled after mixing and tested to determine whether the specific gravity of the full-scale treated material was within an acceptable range compared to the waste treated during the bench-scale study. The Stabilization Field Supervisor observed and inspected all mixing activities.

The preconditioned materials were allowed to cure. During the mixing and the curing period, dust was liberated. Air quality was maintained in accordance with the site-specific Health and Safety Plan for the stabilization/solidification activities. The monitoring frequencies and acceptable dust level limits used were based on the Construction Activities Health and Safety Plan dated August 25, 1995.



Following preconditioning of each lagoon, all preconditioned sludge was consolidated into Lagoons 4 and 6. The stockpiled sludge was covered with fiber-reinforced plastic liners, and the liners were secured. Run-off from Lagoons 4 and 6 was directed into Lagoon 5, the final settling basin.

### Verification Sampling

During preconditioning activities, ENSR collected preliminary verification samples from treated sludge to determine if the preconditioning process alone treated the sludge to below land disposal restrictions (LDRs). A sample was collected from each quadrant of the lagoons from depths to 4 feet below the surface in Lagoons 1, 2, and 4, and 9 feet below the surface in Lagoon 6 (preconditioned sludge from Lagoon 3 had already been moved and combined with Lagoon 6). These samples were analyzed for TCLP cadmium and TCLP chromium, and some for VOCs. All preliminary verification samples collected from Lagoons 1, 2, and 4 met LDRs, but two of the four samples collected from Lagoon 6 were above the LDR for TCLP cadmium. Table 4 presents the results from the sampling events. Analytical data are contained in Appendix A.

**Table 4**  
**Preconditioned Sludge Preliminary Verification Samples Analytical Results**

Sample Designation	Date Collected	Constituent		
		TCLP Cadmium, mg/L (1311/6010)	TCLP Chromium, mg/L (1311/6010)	VOCs, mg/kg (8240)*
Lagoon 1				
L01V000103	11/14/95	0.10 U	0.50 U	
L01V000203		0.10 U	0.50 U	
L01V000303		0.10 U	0.50 U	
L01V000403		0.10 U	0.50 U	
Lagoon 2				
L02V000104	12/07/95	0.10 U	0.50 U	Acetone: 0.800
L02V000204		0.10 U	0.50 U	
L02V000304		0.10 U	0.50 U	
L02V000404		0.10 U	0.50 U	

**Table 4**  
**Preconditioned Sludge Preliminary Verification Samples Analytical Results**

Sample Designation	Date Collected	Constituent		
		TCLP Cadmium, mg/L (1311/6010)	TCLP Chromium, mg/L (1311/6010)	VOCs, mg/kg (8240)*
Lagoon 4				
L04V000104	12/11/95	0.98	0.50 U	Acetone: 0.300
L04V000204		0.72	0.50 U	Acetone: 1.04
L04V000304		0.10 U	0.50 U	Acetone: 0.430 2-Butanone: 0.012 Carbon Disulfide: 0.008
L04V000404		0.10 U	0.50 U	Acetone: 1.60
Lagoon 6				
L06V000109	11/13/95	1.92	0.50 U	NA
L06V000209		0.10 U	0.50 U	
L06V000409		3.14	0.50 U	
L06V000X09		0.50	0.50 U	

**Notes:**

- a — Only volatile constituents that were detected are listed.
- U — Not detected; preceding number is reported limit.
- NA — Not analyzed.
- mg/L — milligrams per liter
- mg/kg — milligrams per kilogram

Once all preconditioned sludge was consolidated into Lagoons 4 and 6, ENSR collected additional preliminary verification samples from the Lagoon 4 stockpile. More than half of the results from this sampling event exceeded the LDR for TCLP cadmium, indicating that the sludge would require additional mixing and/or stabilization reagents. Table 5 presents the results from this event. Laboratory reports are contained in Appendix A.

**Table 5**  
**Analytical Results from Preconditioned Sludge Stockpiled at Lagoon 4**

Sample Designation	Date Collected	Constituent		
		TCLP Cadmium, mg/L (1311/6010)	TCLP Chromium, mg/L (1311/6010)	VOCs, mg/kg (8240) <sup>a</sup>
SP4V000600		2.22	0.50 U	
SP4V000500		0.12	0.50	
SP4V000400		1.02	0.50 U	
SP4V000300		2.80	0.50 U	
SP4V000200		2.78	0.50 U	
SP4V000100		2.44	0.50 U	
SP4V001000		2.02	0.50 U	
SP4V000900		2.28	0.50 U	
SP4V000800		0.10 U	0.50 U	
SP4V000700		0.10 U	0.50 U	
SP4V000624		7.70	0.50 U	
SP4VBTM6X6	1/13/96	0.32	0.50 U	
SP4V000546		1.46	0.50 U	Toluene: 0.012
SP4VBTM512		0.20	0.50 U	
SP4V000457		1.78	0.50 U	Chlorobenzene: 0.012 Tetrachloroethene: 0.012
SP4VBTM412		1.80	0.50 U	
SP4V000357		1.48	0.50 U	
SP4VBTM313		0.18	0.50 U	
SP4V000246		0.12	0.50 U	Chlorobenzene: 0.012 Tetrachloroethene: 0.012 Trichloroethene: 0.006 Xylenes: 0.016

Table 5  
 Analytical Results from Preconditioned Sludge Stockpiled at Lagoon 4

Sample Designation	Date Collected	Constituent		
		TCLP Cadmium, mg/L (1311/6010)	TCLP Chromium, mg/L (1311/6010)	VOCs, mg/kg (8240)*
SP4VBTM210		0.56	0.50 U	
SP4V000146		2.00	0.50 U	
SP4VBTM110		2.82	0.50 U	
SP4V001057		2.64	0.50 U	
SP4VBT1015		0.10 U	0.50 U	
SP4V000946	1/13/96	3.26	0.50 U	
SP4VBTM912		0.78	0.50 U	
SP4V000868		3.88	0.50 U	
SP4VBRM814		0.62	0.50 U	
SP4V000768		0.26	0.50 U	
SP4VBTM713		0.10 U	0.50 U	
SP4CBTM713*		0.10 U	0.50 U	

**Notes:**

- a — Only volatile constituents that were detected are listed.
- U — Not detected; preceding number is reported limit.
- \* — SP4CBTM713 is a field duplicate of SP4VBTM713.
- mg/L — milligrams per liter
- mg/kg — milligrams per kilogram

**Confirmation Sampling**

Confirmation sampling was conducted on the floor and sidewalls of the lagoons in accordance with the June 1995 Removal Action Plan (RAP) to ensure that lagoons had been excavated to below cleanup levels. Confirmation samples along the floor of the excavated lagoons were collected at the nodes of a 70-foot by 70-foot grid. Samples along the sidewalls were collected from mid-depth every 50 feet around the lagoon periphery. The depth of the consolidated sludge in the northern end of Lagoon 6 was determined by digging to the soil beneath the sludge (based on visual observation) and sampling. Confirmation samples collected from the southern portion of Lagoon 6

prior to the pilot study were analyzed for total cadmium, total chromium, and TPH. Results of the final confirmation samples are presented in Tables 6 through 14. There are two tables of data for each lagoon, one for data above and one for data below the cleanup criteria. These tables reference figures for each round of sampling for each lagoon to correlate sample designations with locations and sampling events. The tables cross-referenced with the figures confirm that the cleanup levels were met in all lagoons, except for Lagoon 4, which was not sampled at that time. Lagoons 4, 5, and 6 were sampled for clean confirmation after final stabilization activities had been completed and are summarized in the final AOC Report. Laboratory results are presented in Appendix A.

**Table 6**  
**Lagoon 1 Initial Confirmation Sample Analytical Results**  
**(Areas Requiring Further Excavation — See Figures 3 and 4)**

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round Sampling (Figure 3)</b>				
L01S000300	11/21/95	238	138.0	48.7
L01S000400		628	370	175
L01S000700		375	281	41.0
L01S000800		420	549	32.7
L01S002000		74.1	72.7	36.9
L01C002200*		48.2	39.9	47.1
<b>2nd Round Sampling (Figure 4)</b>				
L01S002400	12/01/95	165	137	74.3
L01S002500		214	86.2	10.0 U

**Notes:**

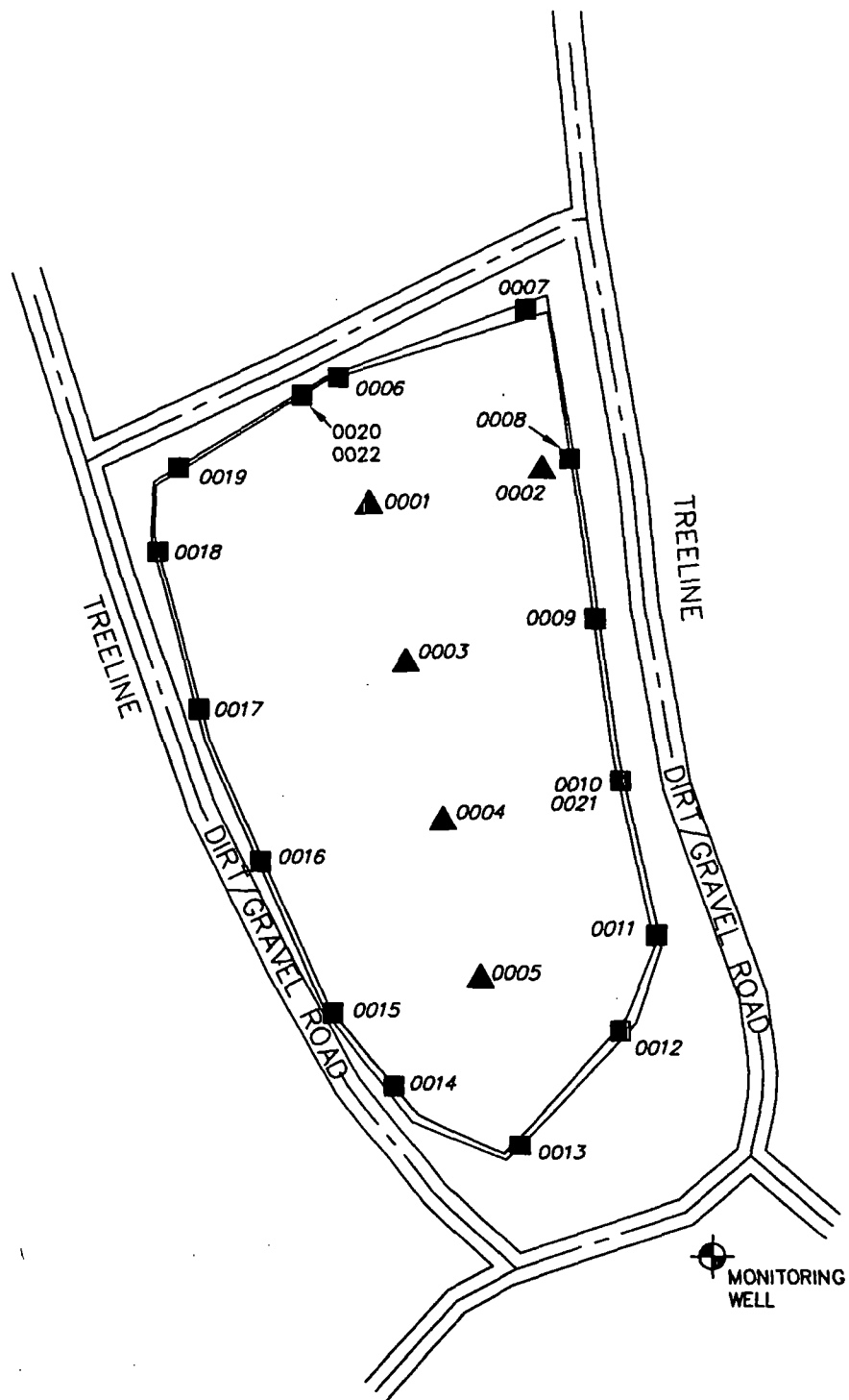
- \* — L01C002200 is a field duplicate of L01S002000.
- U — Not detected; preceding number is reported limit.
- mg/kg — milligrams per kilogram

**Table 7**  
**Lagoon 1 Final Confirmation Sample Analytical Results**  
 (Areas Confirmed Clean — See Figures 3, 4, and 5)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round (Figure 3)</b>				
L01S000100		1.0 U	7.8	10.0 U
L01S000200		1.9	21.0	72.7
L01S000500		43.0	31.4	10.0 U
L01S000600		2.6	14.3	44.0
L01S001000		1.0 U	14.3	10.0 U
L01C002100*		1.0 U	6.5	10.0 U
L01S001100		8.7	20.9	10.0 U
L01S001200	11/21/95	1.0 U	10.9	10.0 U
L01S001300		7.1	20.8	20.2
L01S001400		6.4	18.1	27.2
L01S001500		19.6	34.7	10.0 U
L01S001600		1.0 U	15.2	10.0 U
L01S001700		19.5	28.7	10.0 U
L01S001800		23.9	20.9	10.0 U
L01S001900		12.5	21.5	15.8
L01S002200		48.2	39.9	47.1
<b>2nd Round (Figure 4)</b>				
L01S002300	12/01/95	1.0 U	5.9	10.0 U
L01S002600		1.8	20.6	10.0 U
<b>3rd (Final) Round (Figure 5)</b>				
L01S002700		1.0 U	10.1	10.0 U
L01S002800		1.0 U	12.5	10.0 U
L01S002900	12/08/95	7.8	43.4	10.0 U
L01S003000		4.9	14.9	10.0 U
L01S003100		1.0 U	18.6	10.0 U

**Notes:**

- \* — L01C002100 is a field duplicate of L01S001000.  
 U — Not detected; preceding number is reported limit.  
 mg/kg — milligrams per kilogram



- ▲ SAMPLE LOCATION IN THE BOTTOM/  
FLOOR OF LAGOON
- SAMPLE LOCATION ON THE SIDE WALL  
OF LAGOON



SCALE IN FEET  
1" = 60'-0"

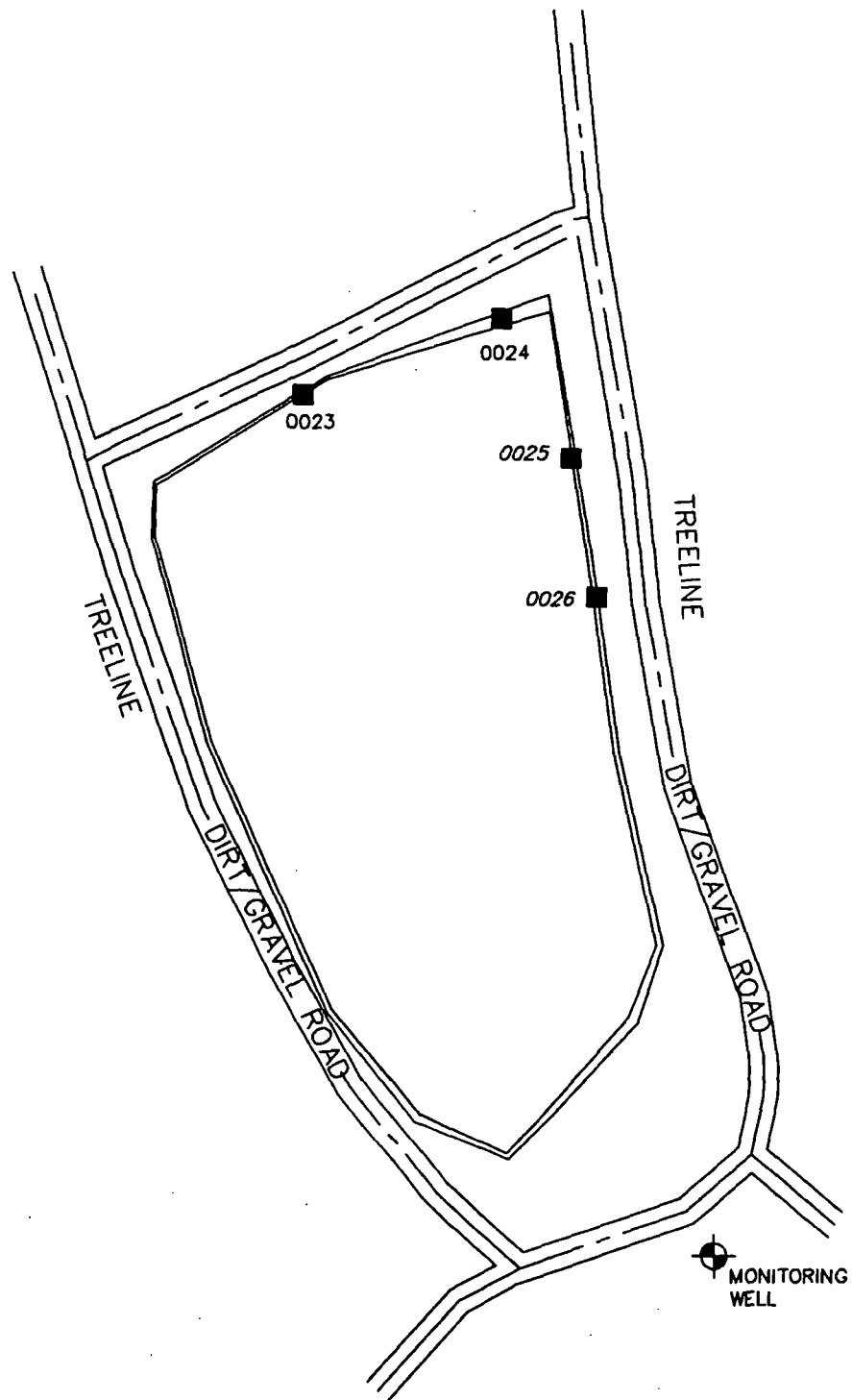


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FIGURE 3  
1st ROUND SAMPLE LOCATIONS  
Lagoon No. 1

United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140A	CHK BY:		



■ SAMPLE LOCATION ON THE SIDE WALL OF LAGOON



SCALE IN FEET  
1" = 60'-0"



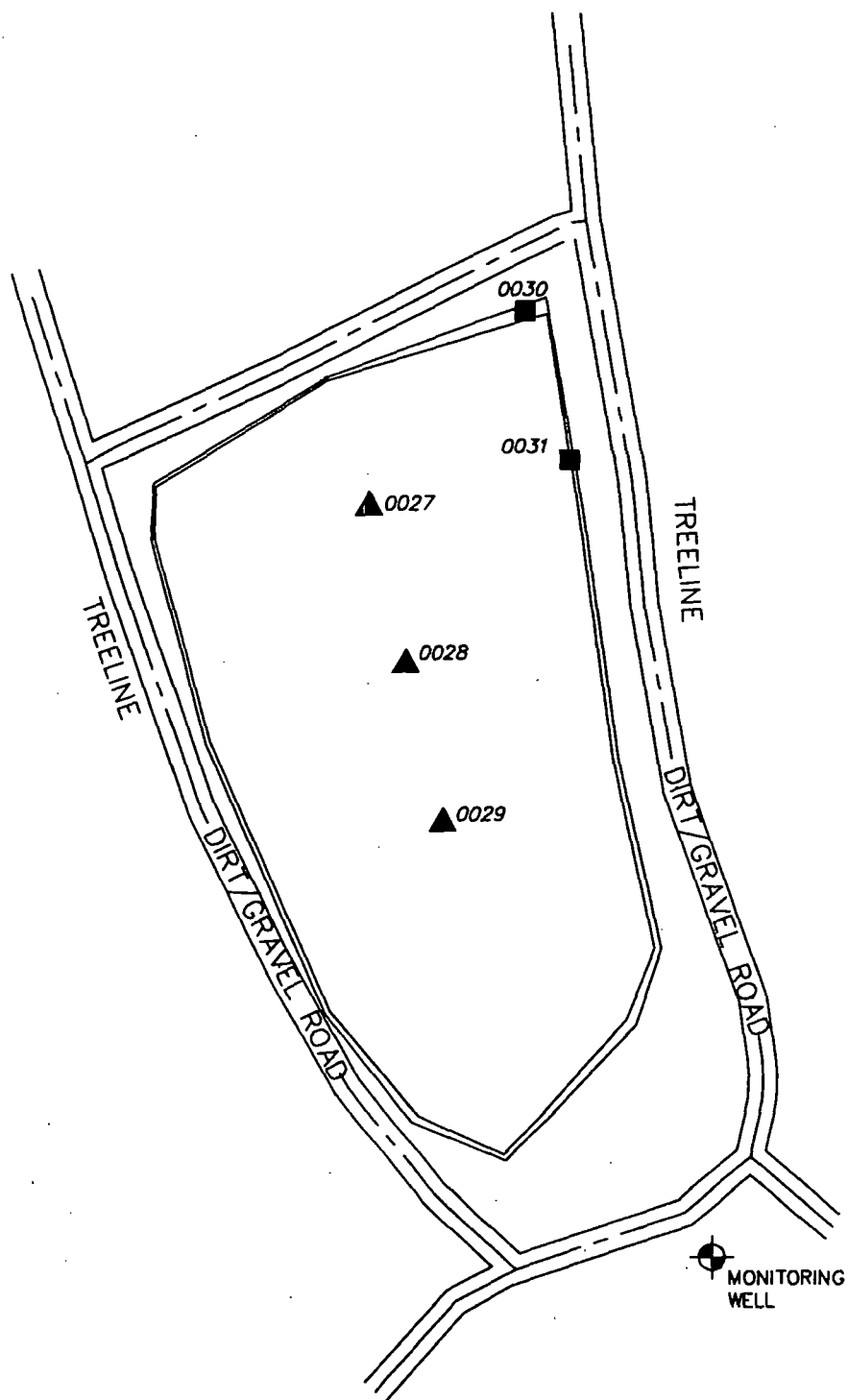
ENSR CONSULTING AND ENGINEERING

FIGURE 4  
2nd ROUND SAMPLE LOCATIONS  
Lagoon No. 1

United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140A	CHK BY:		





- ▲ SAMPLE LOCATION IN THE BOTTOM/  
FLOOR OF LAGOON
- SAMPLE LOCATION ON THE SIDE WALL  
OF LAGOON



SCALE IN FEET  
1" = 60'-0"

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FIGURE 5  
3rd ROUND SAMPLE LOCATIONS

Lagoon No. 1

United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140A	CHK BY:		

**Table 8**  
**Lagoon 2 Initial Confirmation Sample Analytical Results**  
(Areas Requiring Further Excavation — See Figure 6)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round Sampling (Figure 6)</b>				
L02S000700	12/16/95	172	250	62.3
L02S000900		61.8	55.0	38.3

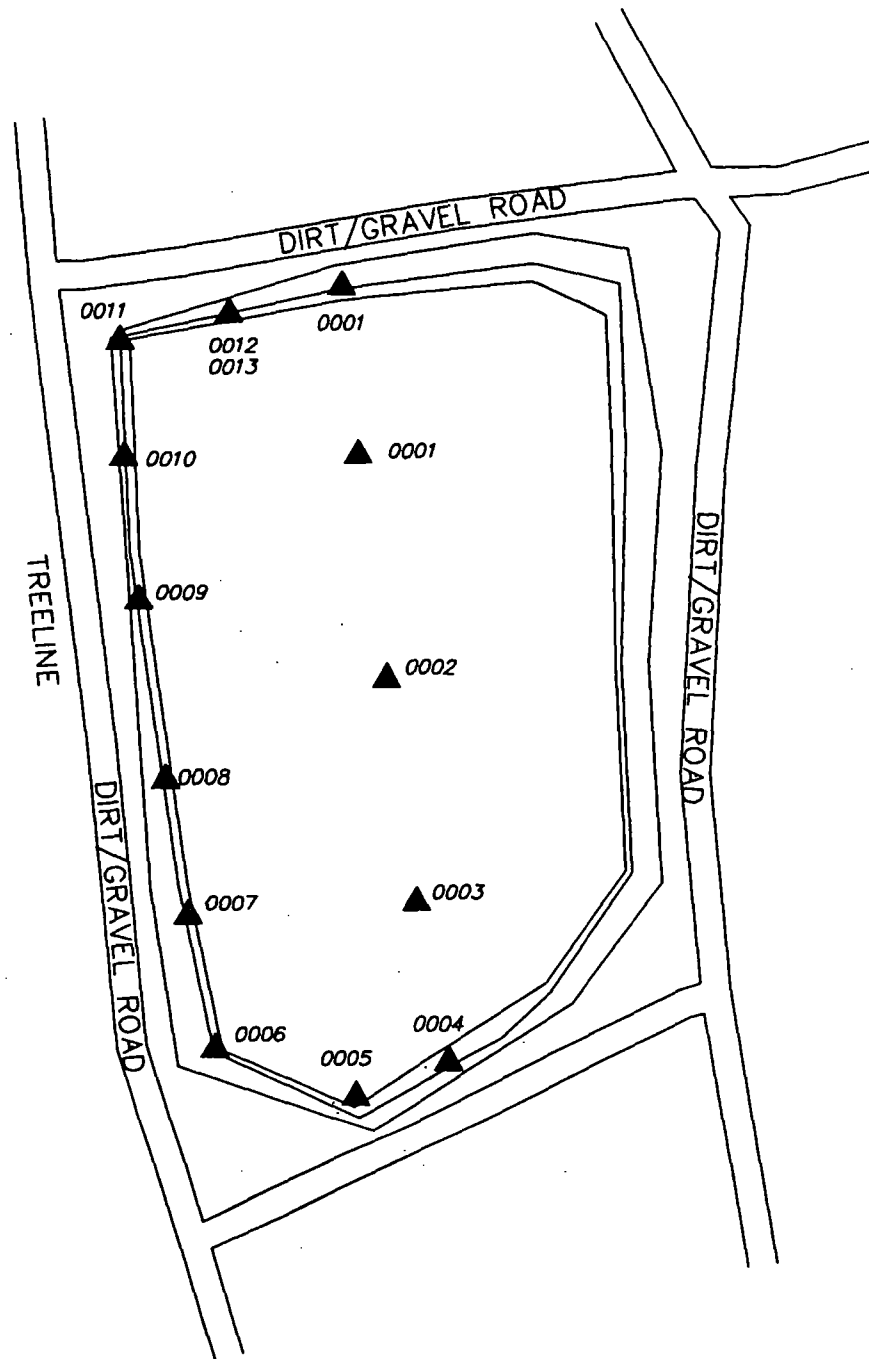
**Note:**  
mg/kg — Milligrams per kilogram

**Table 9**  
**Lagoon 2 Final Confirmation Sample Analytical Results**  
(Areas Confirmed Clean — See Figures 6 and 7)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
1st Round Sampling (Figure 6)				
L02S000100	12/16/95	9.7	13.9	10.0 U
L02S000200		13.2	16.4	10.0 U
L02S000300		8.9	13.3	10.0 U
L02S000400		25.9	43.9	10.0 U
L02S000500		1.0 U	11.4	10.0 U
L02S000600		1.4	9.1	28.5
L02S000800		6.7	13.6	10.0 U
L02S001000		1.6	7.4	10.0 U
L02S001100		1.0 U	9.6	10.0 U
L02S001200		6.9	13.6	10.0 U
L02C001300*		1.0 U	10.4	10.0 U
2nd (Final) Round Sampling (Figure 7)				
L02S001400	12/21/95	1.6	21.6	10.0 U
L02S001500		1.8	13.1	10.0 U

**Notes:**

- \* — L01C001300 is a field duplicate of L01S001200.
- U — Not detected; preceding number is reported limit.
- mg/kg — Milligrams per kilogram

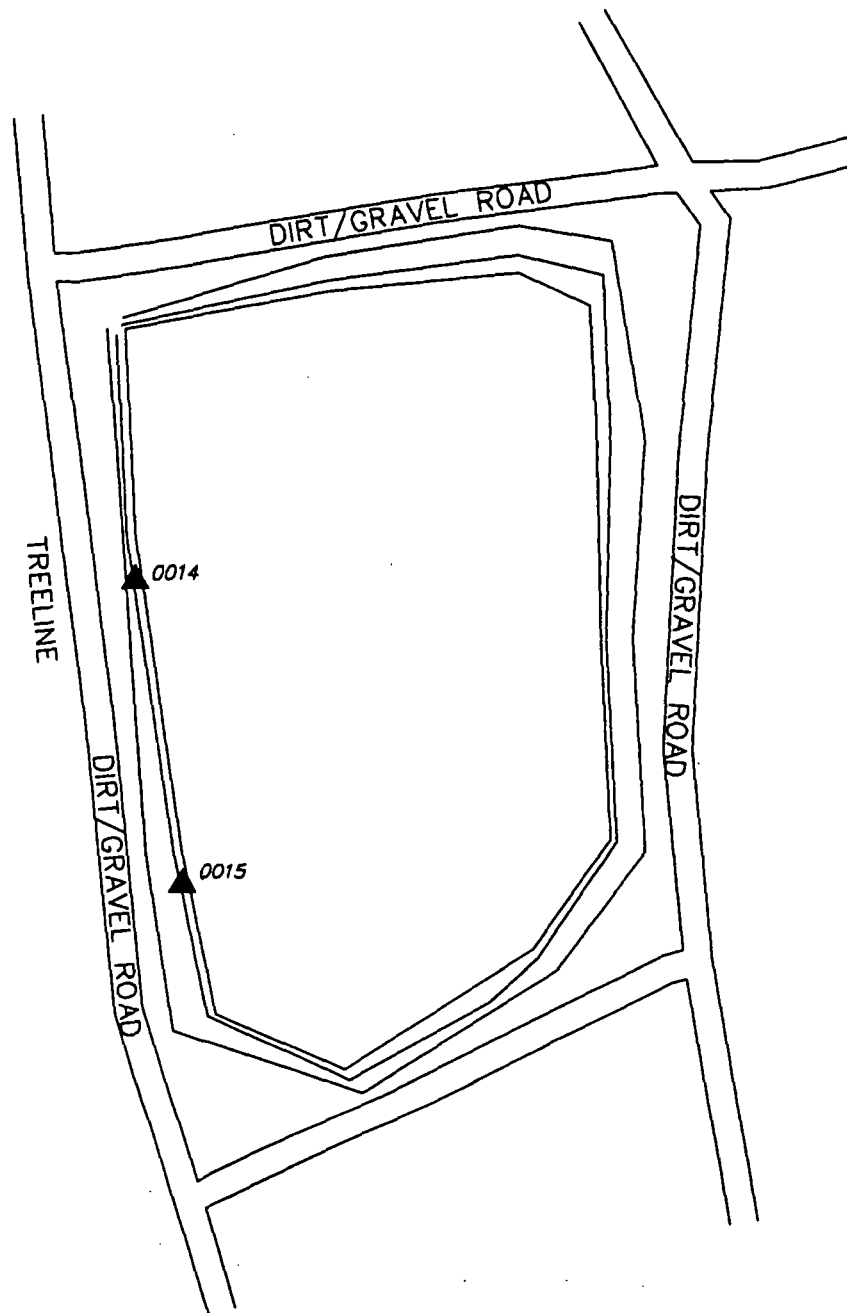


SCALE IN FEET  
1" = 60'-0"

**ENSR**

FIGURE 6  
1st ROUND SAMPLE LOCATIONS  
Lagoon No. 2  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 69161408	CHK BY:		



SCALE IN FEET  
1" = 60'-0"

**ENSR**

FIGURE 7  
2nd ROUND SAMPLE LOCATIONS  
Lagoon No. 2  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/21/98	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140B	CHK BY:		

**Table 10**  
**Lagoon 3 Initial Confirmation Sample Analytical Results**  
(Areas Requiring Further Excavation — See Figures 8 and 9)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round Sampling (Figure 8)</b>				
L03S000200		75.4	146	275
L03S000300		5.6	21.7	224
L03S000400		98.2	168	118
L03S000500		73.4	73.8	68.3
L03S000600	11/30/95	85.4	57.8	87.7
L03S001100		91.5	133	24.9
L03S001200		355	716	25
L03S001300		55	109	867
<b>2nd Round Sampling (Figure 9)</b>				
L03S002000		134	229	86.9
L03S002200	12/16/95	222	497	72.6
L03C002400*		182	332	67.2

**Notes:**

- \* — L03C002400 is a field duplicate of L03S002000.  
mg/kg — Milligrams per kilogram

**Table 11**  
**Lagoon 3 Final Confirmation Sample Analytical Results**  
(Areas Confirmed Clean — See Figures 8, 9, and 10)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round Sampling (Figure 8)</b>				
L03S000100		9.3	31.6	10.0 U
L03S000700		41.4	88.9	58
L03S000800	11/30/95	2.0	16.1	10.0 U
L03S000900		16.9	24.4	10.0 U
L03S001000		29.1	48.8	19.9
L03C001400*		23.4	42.6	18.2

2 11 0030

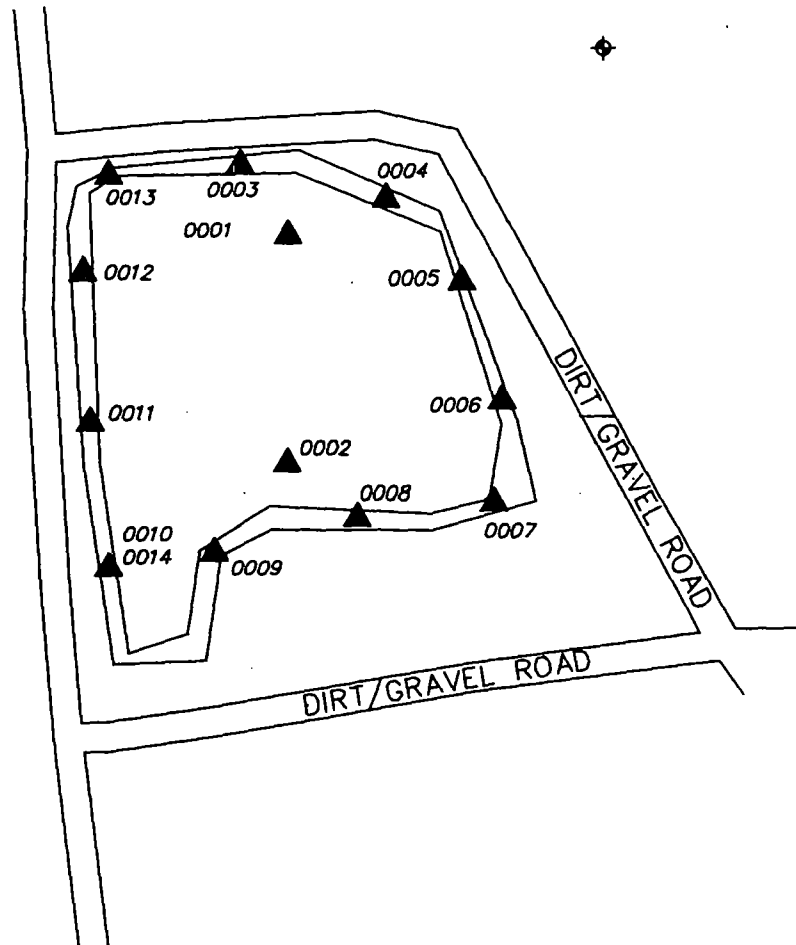
OSC Report — 61 Industrial Park Site  
 Memphis, Tennessee  
 May 2, 1997

Table 11  
 Lagoon 3 Final Confirmation Sample Analytical Results  
 (Areas Confirmed Clean — See Figures 8, 9, and 10)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>2nd Round Sampling (Figure 9)</b>				
L03S001500		1.0 U	4.0	10.0 U
L03S001600		11.8	28.4	212
L03S002100	12/16/95	1.0 U	7.3	10.0 U
L03S002300		1.0 U	9.5	49.6
<b>3rd (Final) Round Sampling (Figure 10)</b>				
L03S002500		1.0 U	9.2	10.0 U
L03S002600	12/21/95	5.7	29.4	10.0 U

**Notes:**

- \* — L03C001400\* is a field duplicate of L03S001000.
- U — Not detected; preceding number is reported limit.
- mg/kg — Milligrams per kilogram



▲ SAMPLE LOCATION

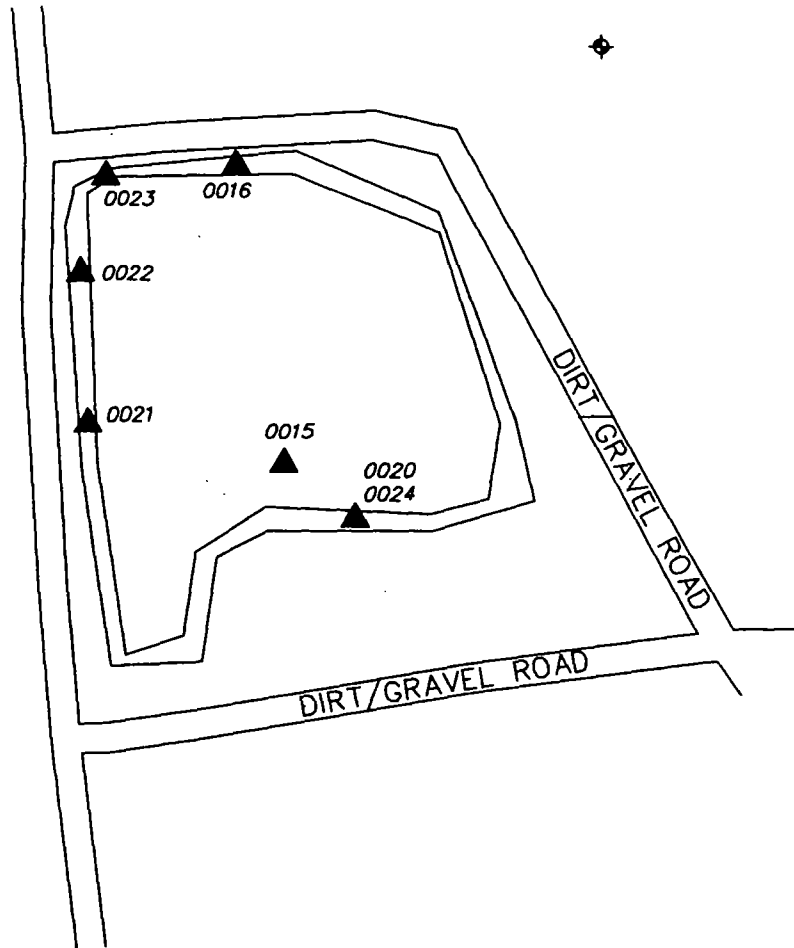


SCALE IN FEET  
1" = 60'-0"

**ENSR**

FIGURE 8  
1st ROUND SAMPLE LOCATIONS  
Lagoon No. 3  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140C	CHK BY:		



▲ SAMPLE LOCATION



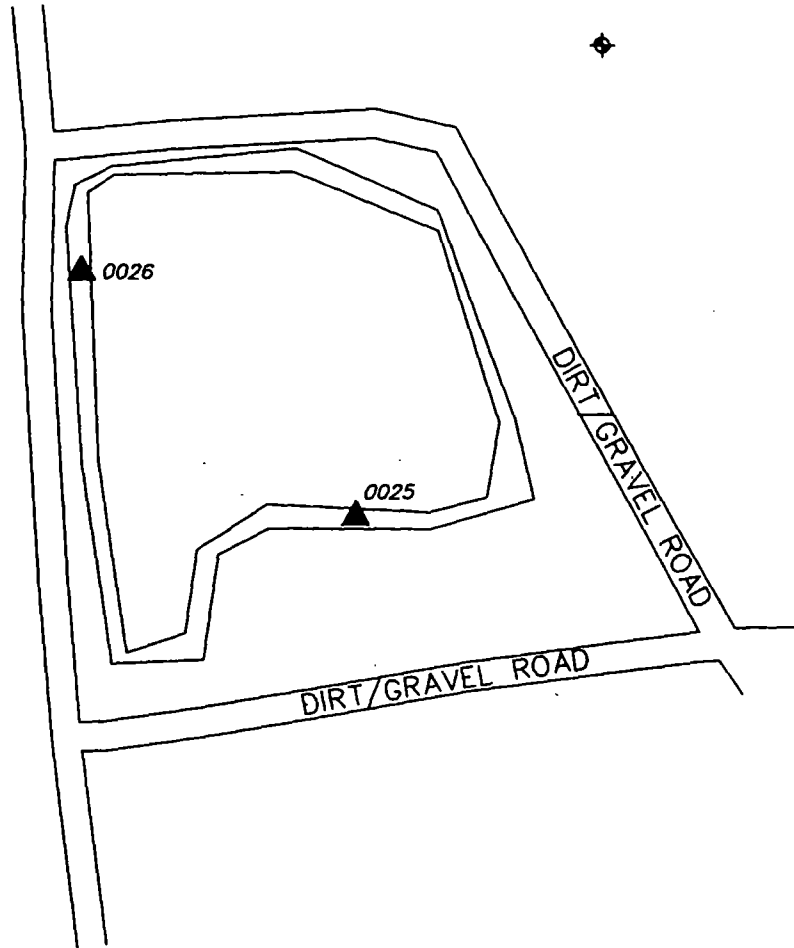
SCALE IN FEET  
1" = 60'-0"

**ENSR**

FIGURE 9  
2nd ROUND SAMPLE LOCATIONS  
Lagoon No. 3  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140C	CHK BY:		





▲ SAMPLE LOCATION



SCALE IN FEET  
1" = 60'-0"

**ENSR**

FIGURE 10  
3rd ROUND SAMPLE LOCATIONS

Lagoon No. 3  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140C	CHK BY:		

**Table 12**  
**Lagoon 5 Initial Confirmation Sample Analytical Results**  
 (Area Requiring Further Excavation — See Figure 11)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round Sampling (Figure 11)</b>				
P5-2	10/02/95	198	294	63.8

*Note:*  
 mg/kg — Milligrams per kilogram

**Table 13**  
**Lagoon 5 Final Confirmation Sample Analytical Results**  
 (Areas Confirmed Clean — See Figures 11 and 12)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round Sampling (Figure 11)</b>				
P5-1		50.8	112	10.0 U
P5-3		26.9	56.8	10.0 U
P5-SW1		1.0 U	11.6	10.0 U
P5-SW2		1.4	9.6	29.6
P5-SW3		1.0 U	12.7	10.0 U
P5-SW4		1.0 U	10.8	10.0 U
P5-SW5		8.6	28.0	10.0 U
P5-SW6	10/02/95	1.0 U	10.6	10.0 U
P5-SW7		1.0 U	15.3	10.0 U
P5-SW8		1.0 U	12.6	10.0 U
P5-SW9		2	18.2	10.0 U
P5-SW10		11.8	49.3	10.0 U
P5-SW11		5.2	21.9	10.0 U
P5-SW12		18.0	35.2	10.0 U
P5-SW13		42.4	115	10.0 U
P5-SW14*		2.6	14.7	10.0 U

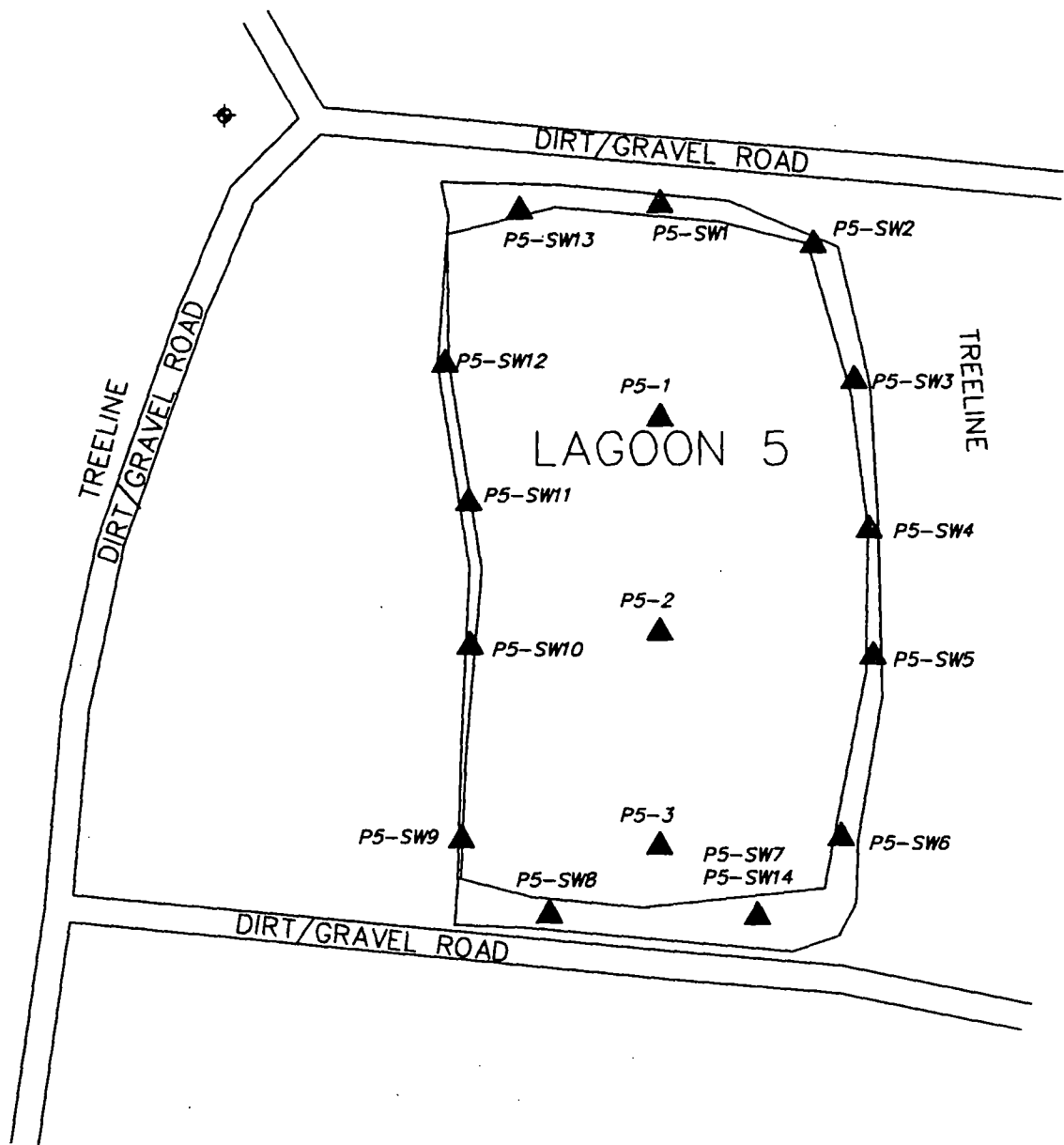
OSC Report — 61 Industrial Park Site  
Memphis, Tennessee  
May 2, 1997

Table 13  
Lagoon 5 Final Confirmation Sample Analytical Results  
(Areas Confirmed Clean — See Figures 11 and 12)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
2nd (Final) Round Sampling (Figure 12)				
L05S000100	10/05/95	9.8	35.6	1.0 U

**Notes:**

- \* — P5-SW14 is a field duplicate of P5-SW7.
- U — Not detected; preceding number is reported limit.
- mg/kg — Milligrams per kilogram



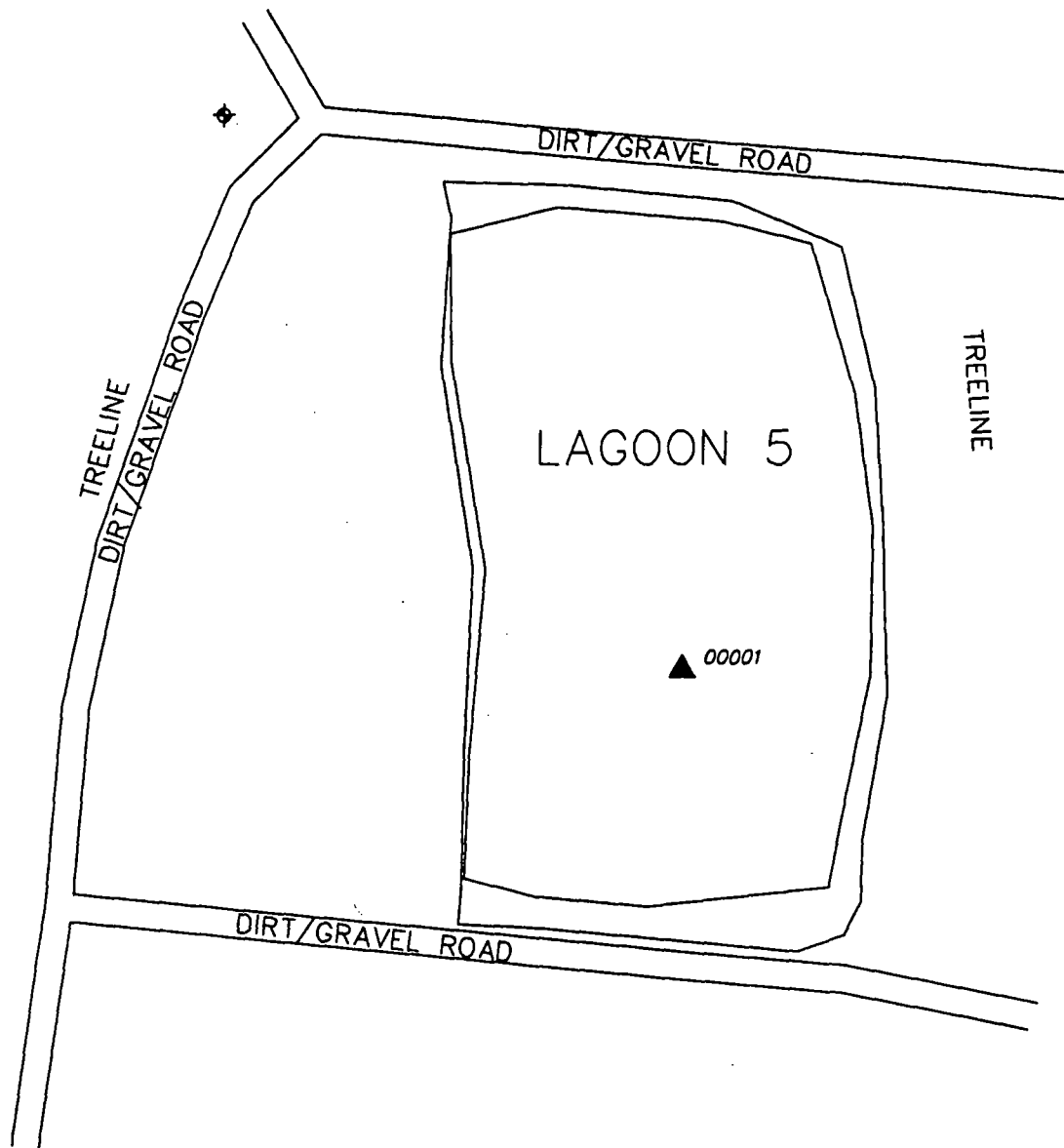
SCALE IN FEET  
1" = 60'-0"

**ENSR**

FIGURE 11  
1st ROUND SAMPLE LOCATIONS  
Lagoon No. 5

United Technologies Auto.  
Memphis, Tennessee

DRAWN: J.Ferranti	DATE: 5/22/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140D	CHK BY: RDM		



60 0 60 120



SCALE IN FEET

1" = 60'-0"

**ENSR**

## FIGURE 12

2nd ROUND SAMPLE LOCATIONS

Lagoon No. 5

United Technologies Auto.

Memphis, Tennessee

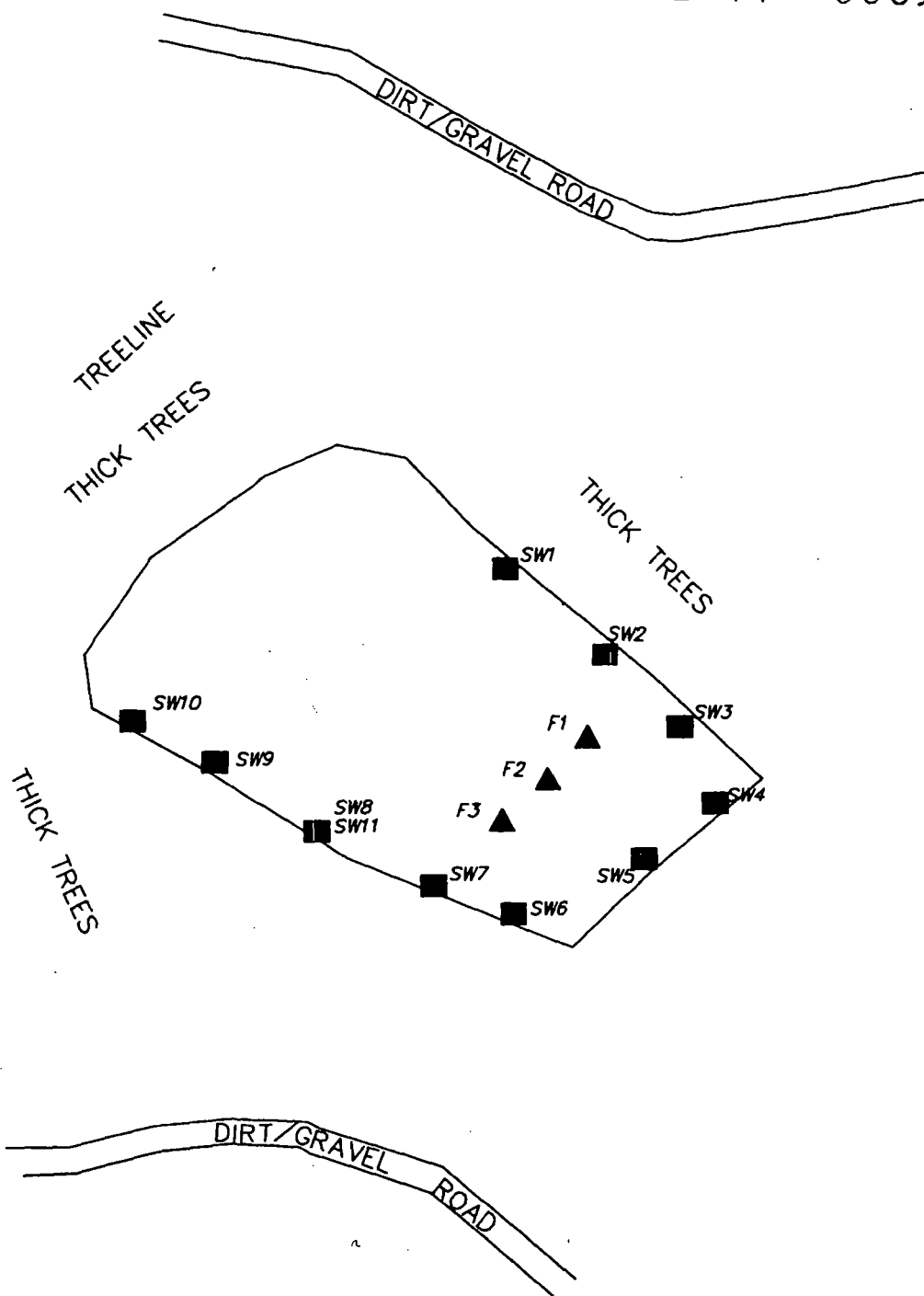
DRAWN: J.Ferranti	DATE: 5/22/98	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140D	CHK BY: RDM		

**Table 14**  
**Lagoon 6 Confirmation Sample Analytical Results**  
(See Figures 13 and 14)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1 MOD)
<b>Confirmation Samples Collected Prior to the Pilot Demonstration (Figure 13)</b>				
SW-1		18.4	23.6	4.4
SW-2		81.5	55.0	26.5
SW-3		34.4	25.9	9.6
SW-4		5.4	18.8	8.5
SW-5		20.4	35.3	4.1
SW-6		14.9	18.9	15.5
SW-7	9/23/95	8.7	23.6	10.3
SW-8		10.9	31.2	11.3
SW-9		32.6	37.6	6.8
SW-10		19.1	27.2	4.0
SW-11*		20.2	30.3	3.7
F-1		4.8	21.5	3.1
F-2		1.0 U	17.6	2.0
F-3		1.0 U	13.7	2.6
<b>Samples Collected from Below the Sludge (Figure 14)</b>				
L06S000100		1.0 U	12.6	3.5
L06S000200		4.1	14.2	6.2
L06S000300	11/13/95	41.0	55.0	4.1
L06S000400		1.0 U	13.5	2.3
L06S000500		6.2	22.3	2.1
L06S000600		43.1	43.8	21.7

**Notes:**

- a — Final confirmation sampling be conducted on the floors and sidewalls of Lagoon 4 and 6 to verify that the entire depth of sludge has been treated and removed as described in the sludge removal section of this report.
- \* — SW-11 is a field duplicate of SW-8.
- U — Not detected; preceding number is reported limit.
- mg/kg — Milligrams per kilogram



- ▲ SAMPLE LOCATION IN THE BOTTOM/  
FLOOR OF LAGOON
- SAMPLE LOCATION IN THE SIDE WALL  
OF LAGOON



**ENSR**

FIGURE 13  
9/23/95 SAMPLE LOCATIONS  
(Samples Collected Prior to Pilot Study)

Lagoon No. 6  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: JDF	DATE: 5/22/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140K	CHK BY:		

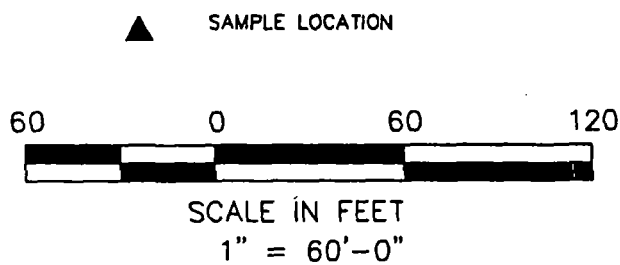
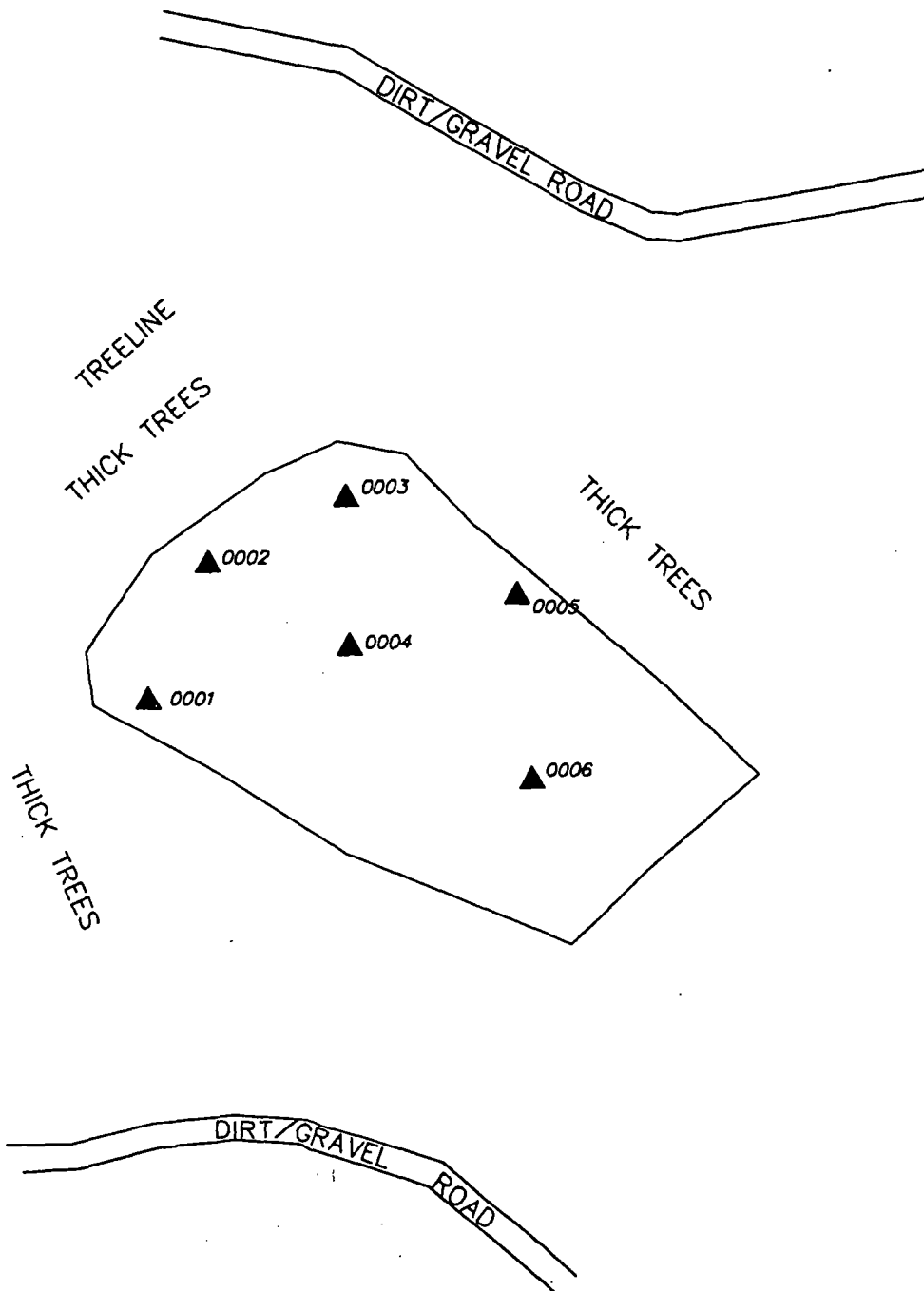

**ENSR**

FIGURE 14  
11/13/95 SAMPLE LOCATIONS  
(Collected from Below the Sludge)  
Lagoon No. 6  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: M. SCOP	DATE: 5/22/98	PROJECT NO. 8916-140-100	REV.
FILE NO. 8916140E	CHK BY:		



### 2.3.3 Lagoon Water Discharge

ENSR has been corresponding with the City of Memphis publicly owned treatment works (POTW) to ensure compliance for the discharge of the lagoon water to the POTW. After securing access agreements (included in Appendix F), discharge hosing pipe was run from the lagoons to the manway to discharge directly from the lagoons to the Horn Lake Sewer interceptor. Upon installing the piping system, ENSR pressure-tested the system to ensure tightness. Results of this test are included in Appendix G. A Site and Sewer Line Aerial Photo, Lagoon Dewatering System Routing diagram, and the P&I Dewatering System diagram are included in the July 1996 Supplemental Removal Action Plan submitted to EPA. A settling tank was used to minimize the entrainment of sediment into lagoon water during discharge to the interceptor.

Due to a delay in obtaining an access agreement and to facilitate lagoon dewatering, ENSR removed the sludge from Lagoon 5 and used it as a retention basin to store water from the other lagoons. Sludge from Lagoon 5 was transferred to Lagoon 4. Before placing water into Lagoon 5, ENSR conducted confirmation sampling on the floor and sidewalls of the excavated lagoon to verify that the sludge had been removed. The remaining lagoons were dewatered either by direct drainage or by pumping into Lagoon 5. Accumulated rainwater that contacted preconditioned sludge was drained into Lagoon 5 for discharge to the POTW. ENSR sampled, obtained POTW approval, and discharged three batches of lagoon water, totaling more than 3 million gallons. Tables 15 through 17 present the results of the discharge sampling events. After July 1996, ENSR obtained approval from EPA and the POTW (letters dated September 16 and October 7, 1996, respectively) to drop total toxic organics (TTOs) from the list of required parameters since TTOs had not been detected at significant concentrations in past events. Laboratory data sheets for these sampling events are included in Appendix A.

Table 15  
 Analytical Results from Wastewater Discharge Samples  
 11/21/95 Sampling/Discharge Event

Analyte	Concentration, in milligrams per liter			
	Sample Designation			
	L05W000500	L05W000600	L05W000700	L05W000856
Silver	0.005 U	0.005 U	0.005 U	0.005 U
Cadmium	0.0020	0.0030	0.0030	0.0030
Chromium	0.007	0.008	0.008	0.011
Copper	0.20	0.020	0.020	0.022
Nickel	0.015	0.015	0.017	0.017

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**Table 15**  
**Analytical Results from Wastewater Discharge Samples**  
**11/21/95 Sampling/Discharge Event**

Analyte	Concentration, in milligrams per liter			
	Sample Designation			
	L05W000500	L05W000600	L05W000700	L05W000856
Lead	0.003 U	0.003 U	0.003 U	0.004
Zinc	0.020 U	0.020 U	0.020 U	0.020 U
Total Cyanide	0.010 U	0.010 U	0.010 U	0.010 U
Total Suspended Solids	80	46	27	33
Total Toxic Organics	No constituents from the Total Toxics Organics List (40 CFR) were detected.			

**Note:**

U — Not detected; preceding number is reported limit.

**Table 16**  
**Analytical Results from Wastewater Discharge Samples**  
**1/13-19/96 Sampling/Discharge Event**

Analyte	Concentration, in milligrams per liter			
	Sample Designation			
	L05W000978	L05W001001	L05W001101	L05W001201
Silver	0.005 U	0.005 U	0.005 U	0.005 U
Cadmium	0.1350	0.001 U	0.001 U	0.001 U
Chromium	0.259	0.009	0.011	0.011
Copper	0.267	0.059	0.064	0.066
Nickel	0.165	0.040	0.046	0.045
Lead	0.025	0.006	0.005	0.006
Zinc	0.849	0.020 U	0.020 U	0.020 U
Total Cyanide	0.010 U	0.010 U	0.010 U	0.010 U
Total Suspended Solids	1,640	10 U	20	20

**Note:**

U — Not detected; preceding number is reported limit.

Table 17  
Analytical Results from Wastewater Discharge Samples  
3/15/96 Sampling/Discharge Event

Analyte	Concentration, in milligrams per liter Sample Designation		
	L5SP2-01-05	L5SP-1-01-05	L5SP3-01-05
Silver	NA	0.005 U	0.005 U
Cadmium	0.001 U	0.001 U	0.001 U
Chromium	0.05 U	0.005 U	0.005 U
Copper	0.010 U	0.010 U	0.010 U
Nickel	0.010 U	0.010 U	0.010 U
Lead	0.003 U	0.003 U	0.003 U
Zinc	0.023	0.020 U	0.01 U
Total Cyanide	0.010 U	0.010 U	0.010 U
Total Suspended Solids	39	54	13
Total Toxic Organics*	Ethylbenzene: 0.027 Xylenes: 0.027	Xylenes: 0.012	

**Notes:**

- \* — Only those Toxic Organic constituents detected are listed.  
U — Not detected; preceding number is reported limit.

## 2.4 Drum Sweep, Sampling, Hazard Categorization, and Recovery

This phase of the project began on April 25, 1995. The site was divided into 11 zones (A through K). Laidlaw systematically searched each zone, numbering the drums sequentially. A drum profile sheet was written for each drum, stating the size, condition, whether it was overpacked, and how much material it contained. A second crew sampled the drums. The samples were hazard-categorized (hazcatted) by a Laidlaw chemist, and designated to one of 19 categories. A drum-staging area was established and the area was divided by category. Figure 2 is a site diagram showing the 11 zones and the staging area. After the drums were categorized, they were recovered from the field and taken to the staging area. Empty drums were also recovered from the field, and were taken to the front of the site, crushed, and sent for recycling by the Lazarov Brothers Tin Compress Company, Inc., in Memphis, Tennessee.

Laidlaw spent approximately two months completing the drum sweep, sampling, hazcat, and recovery. Laidlaw processed approximately 2,600 drums. Most of the drums were empty; many

that contained materials were in poor condition and had to be overpacked in the field before transport to the staging area. Table 18 shows the 19 categories, how many drums were designated in each group, and the sample number each group was given prior to disposal profiling.

Compatibility tests were then performed on each group prior to representative samples being collected and submitted to Environmental Science Corporation (ESC) of Mount Juliet, Tennessee, for disposal profiling. The letter approving ESC as the analytical laboratory from the EPA can be found in Appendix D. All drum recovery areas were marked with numbered pin flags. Upon completion of the drum sweep and recovery, the drum-staging area was secured and checked periodically until the drums were transported for disposal. The disposal phase is discussed in Section 3.

**Table 18**  
**Highway 61 Industrial Park**  
**Drummed Waste Summary**

Category	Sample I.D.	# of Drums
Organics, Liquid	61AL000101	219
Organics, Solid	61AS000101	71
Base Neutral, Liquid	61AL000201	64
Base Neutral, Solid	61AS000201	18
Halogen, Liquid	61AL000301	2
Halogen, Solid	61AS000301	41
Sulfide, Liquid	61AL000401	2
Sulfide, Solid	61AS000401	3
Oxidizer, Liquid	61AL000501	1
Oxidizer, Solid	61AS000501	16
Peroxide, Solid	61AS000601	3
Acid, Liquid	61AL000701	3
Acid, Solid	61AS000701	2
Base, Liquid	61AL000801	32
Base, Solid	61AS000801	18
Cyanide, Liquid	61AL000901	5
Cyanide, Solid	61AS000901	1

**Table 18**  
**Highway 61 Industrial Park**  
**Drummed Waste Summary**

Category	Sample I.D.	# of Drums
Halogenated Acid, Liquid	61AL001001	1
Polychlorinated Biphenyls	61CZ1224744/61KZ1226044	2

Immediate action was taken to clean up one area where drum leaks were a concern. This took place in Zone B in an area directly south of Lagoon 3. The area contained approximately 300 drums, most of which were buried along a hillside. Some spillage occurred during recovery due to the drums' condition. An earthen berm was constructed around the area and was covered with plastic sheeting. The next day the material and impacted soil were excavated and placed in drums. These drums were then sampled, hazcatted, and taken to the staging area. The leaking material was a petroleum-based, nonpolychlorinated biphenyl (PCB) oil. This area was excavated and confirmation samples were collected during the excavation phase of the cleanup.

During the recovery of drums from the field, a storage building in Zone C that had fallen in on itself was discovered. Inside the building were drums containing metal-plating chemicals including catalyst, accelerator, replenisher, and acids. Heavy equipment was used to dismantle the building. The drums were processed, recovered, and staged.

Also located and sampled in the building was a pallet of asbestos brake shoes, and PCB transformers (sample analytical results are in Appendix A). The PCB transformers were placed in two drums and placed in the drum-staging area. Lead-acid batteries found in the building were moved to the staging area with other lead-acid batteries found onsite. Material Safety Data Sheets (MSDSs) are in Appendix H.

A plating line was discovered adjacent to this storage building. It was decontaminated and the waste was disposed of by UT Automotive during the disposal phase. This procedure is discussed in Section 2.10.

A small water-analysis laboratory also was discovered during the drum sweep. The chemicals in this laboratory were in small containers (50-milliliter vials to 1-liter glass bottles). These chemicals could not be reasonably hazcatted and staged due to the containers' sizes. The identified chemicals from this laboratory were tested for compatibility with previously hazcatted drummed material. These materials were then bulked with a compatible drummed material. Unidentified chemicals and empty containers were crushed and mixed with lime using a backhoe. The lime mixture was then placed in a drum, hazcatted, and staged for disposal.

Kerr Brothers leased a section of property at the northeast corner of the site as a scrap metal yard. Approximately 50 drums were in this area. The drums and their contents were processed, sampled, hazcatted, and staged with the other drums from the site. The empty drums were crushed and sent for recycling to the Lazarov Brothers Tin Compress. Further investigation into this yard identified slag piles, tankers containing roofing tar, lead-acid batteries, and oxygen and acetylene cylinders. These materials were staged and debris was cleared from the yard. The yard was secured until disposal for the various materials was arranged.

## **2.5 Excavation Activities Associated with Drummed Material**

Excavation began on June 27, 1995, with the consolidation of slag piles on a concrete slab in Zone E. The slag piles were bermed and covered with plastic sheeting. These activities continued with the excavation of all areas of stained soil. Samples were collected in all areas that had contained drummed material but were not stained. Excavation continued in areas where contamination was detected in soil above the cleanup limits (Table 1). Confirmation samples were submitted to ESC. Excavation activities strictly adhered to the following objectives established by the On-scene Coordinator (OSC) and defined in the UAO:

- Respondent shall remove and dispose of the contaminated sludges, drums, drummed waste, batteries, slag piles, explosives, contaminated soil, and associated contamination exceeding cleanup levels.
- Promptly following such removal, respondents shall perform confirmatory sampling in and adjacent to the excavated areas and, to the extent associated contamination exceeding cleanup goals is identified, respondents shall remove and dispose of such associated contamination until confirmatory sampling demonstrates compliance with cleanup levels.
- Any areas where drums or hazardous materials had been located where the surrounding soil was stained or discolored will be excavated and confirmation samples collected.
- All areas where drums or hazardous materials were found where the surrounding soil were not stained or discolored will be sampled. Excavation will follow in areas where contamination was detected above cleanup levels.

Visibly contaminated soil was excavated and stockpiled on plastic sheeting. The stockpiles were then bermed and covered with plastic sheeting. Twenty areas were excavated; two areas deemed too large for one representative sample were split upon sampling. The excavated soil was staged in 15 stockpiles. After the visibly contaminated soil was excavated, the soil was sampled and analyzed for the parameters listed in Table 1.

When analytical results were above the cleanup levels, the corresponding area was excavated again and another sample collected. That sample was analyzed for the constituents above cleanup levels. A field TPH screen was used to determine the depth of each excavation. This process was repeated until all constituents were below cleanup levels.

The Kerr Brothers yard was divided into 12 grids, 10 of which measured 50 feet by 50 feet. The last two encompassed two small areas that were not enclosed in the original 10. By using the TPH field screen, one small area in Grid 1 was found to have TPH contamination to 6 feet below ground surface (bgs). An area 8 feet by 8 feet by 6 feet deep was excavated there; the material removed did not appear to be native soil. Excavation continued until native soil was reached on all sides. During this excavation, a sample (61IS050136) collected at 36 inches bgs was analyzed for the cleanup parameters. All constituents were below detection limits except chromium at 7.3 parts per million (ppm), and TPH at 3,900 ppm. Excavation continued in this area until Laidlaw and EnSafe demobilized prior to the disposal phase. Before demobilization, another sample (61IS050274) was collected at 74 inches bgs; TPH contamination was at 1,400 ppm. The hole was lined with plastic sheeting, marked with stakes, and backfilled with clean soil.

Upon return to the site for the disposal phase, the hole was reopened and excavation continued. A final confirmation sample (HW61041720) was collected April 17, 1996, at 96 inches bgs. TPH concentrations were less than 10 ppm in this final sample. These analytical results can be found in Appendix A.

During the excavation activities, Grid 12 in the Kerr yard was covered with plastic sheeting and used to stockpile excavated soil. During the disposal phase, this area was excavated as the stockpile was transported to the landfill, and a confirmation sample (HW61041116) was collected. Analytical results from this sample were below cleanup levels, as shown on the stockpile maps and tables in Appendix A.

Slag from the Kerr Brothers yard was stockpiled on the concrete slab in Zone E with the other slag. All excavated material from slag areas was stockpiled on this concrete slab.

Elevated TPH concentrations were detected by the field screen in an excavation within an area of Zone E. The investigation of this area identified underground pipes suspected to have leaked heating oil. The analytical results of a sample (61ES050060) collected from this area during excavation showed TPH concentrations at 16,000 ppm. Analytical results are included in Appendix A. This area was bermed and secured, and then excavated during the disposal phase by UT Automotive. Specifics of this excavation can be found in Section 2.9.

Upon completion of the excavation, the TAT collected confirmation samples from some of the excavations. The analytical results from one of these samples (Grid 11 in the Kerr yard) were above the cleanup level for TPH. EnSafe's sample from the same location (61IS003206) was

below cleanup levels for TPH. EPA and EnSafe agreed that a third sample would be collected to determine if additional excavation was necessary. The third sample in this area (HWC1041115) contained TPH concentration below method detection limits, so no further excavation was needed in this area. Analytical results are in Appendix A.

The following figures (15-23) show the areas that were excavated and sampled, and the date, sample identification, and analytical results of the samples collected from each excavation. Once analytical results demonstrated that an area was below cleanup levels for any particular constituent, that constituent was no longer analyzed. Constituents above cleanup levels were analyzed for after each excavation until they were below cleanup levels. Analytical results from the excavation phase are included in Appendix A.

## **2.6 Wetlands Excavation**

Prior to wetland excavation, ENSR contacted the U.S. Army Corps of Engineers and received authorization under a 404 general permit to conduct removal activities in the wetland area (a copy of the authorization is included in Appendix I).

Excavation of impacted soils in the wetlands was completed during several events spanning September 1995 through August 1996. Figure 24 shows the location(s) of the wetlands excavation (relative to the site). Figures 25 through 28 show the sample locations from each sampling round. Tables 19 and 20 present analytical results from the sampling events.

The wetlands removal action began with the excavation of 100 cubic yards of soil. Based on comparison of the analytical results with the cleanup levels established in the UAO, 12 grid areas had been confirmed excavated to below cleanup levels (see Table 20, first-round sampling), and 12 grid areas would require further excavation (see Table 19, first-round sampling). One foot of soil was removed from the grids exceeding cleanup levels. A second round of confirmation sampling was completed on October 3, 1995. Results from the second-round sampling event identified seven of 12 grid areas remained above project cleanup criteria (see Tables 19 and 20, second-round sampling). Two feet of soil were removed from the remaining impacted grids, and a third round of confirmation sampling was conducted on October 6, 1995. Results of the third sampling round identified one grid area remained above cleanup levels. Two feet of soil were excavated from the remaining impacted grid, and the confirmation sample was collected on October 10, 1995. Results confirmed that the grid had been excavated to below cleanup levels.

A total of 395 in-place cubic yards of soil from the wetland area were excavated and transferred to Lagoon 4 or 6 for future treatment. An expansion factor of 1.3 increased the amount to approximately 515 cubic yards.



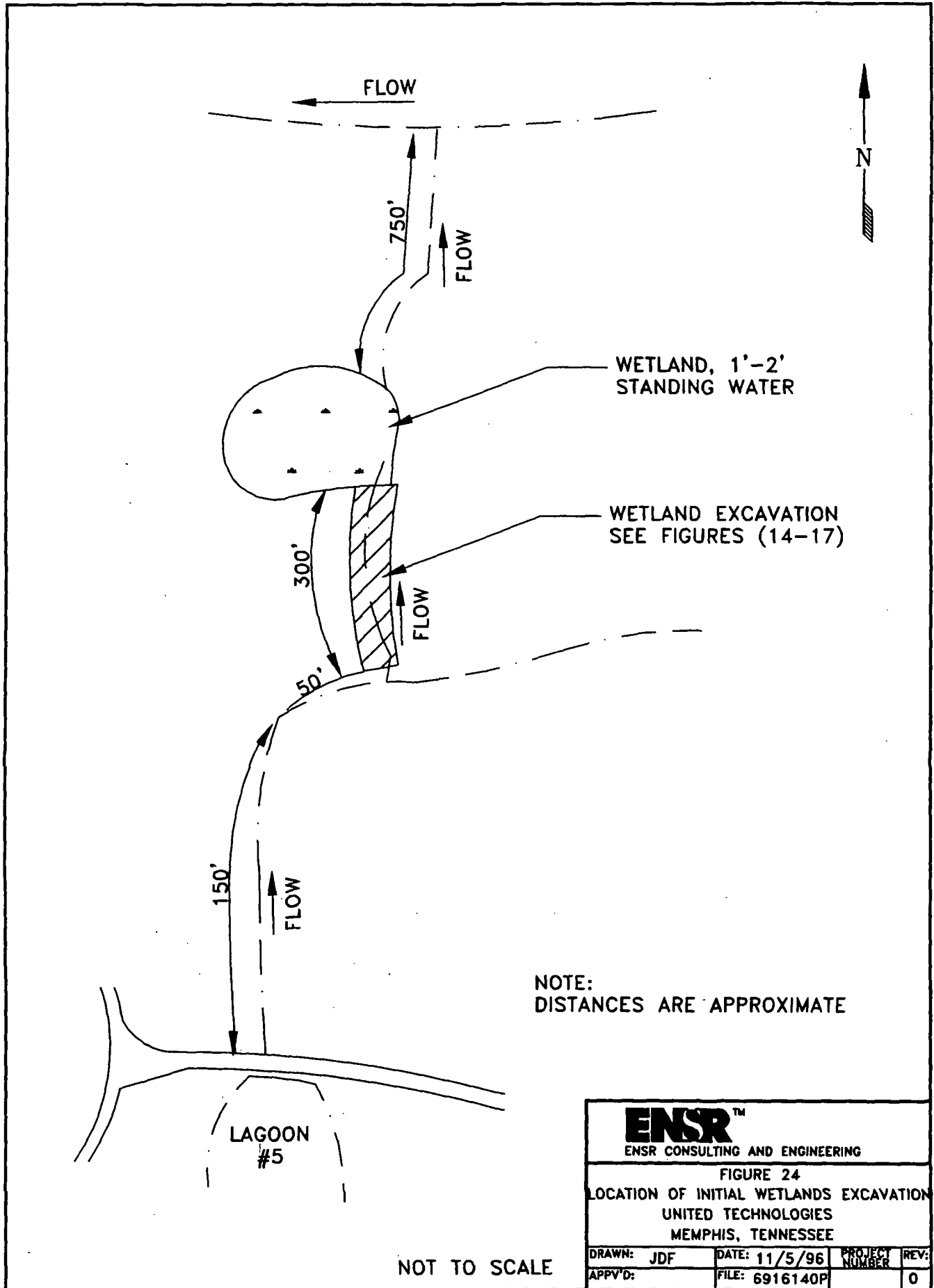


Table 19  
 Wetland Excavation Initial Confirmation Sample Analytical Results  
 (Areas Requiring Further Excavation — See Figures 25, 26, and 27)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
1st Round Sampling (Figure 25)				
WL-2	9/25/95	60.8	75.4	1.0 U
WL-4		94.5	114	8.1
WL-5		287	277	5.6
WL-9		317	1,660	5.6
WL-11		215	535	4.8
WL-12		234	717	7.2
WL-14		125	74.5	2.3
WL-15		78.3	97.3	10.6
WL-17		138	515	4.4
WL-18		154	827	6.0
WL-19		128	119	7.5
WL-21		310	308	4.6
2nd Round Sampling (Figure 26)				
WETS000300	10/3/95	211	299	10 U
WETS000500		80.2	53.2	10 U
WETS000600		117	149	22.5
WETS000700		111	128	32.7
WETS000800		87.0	90.1	10 U
WETS000900		214	139	38.0
WETS001200		217	163	10.0 U
3rd Round (Figure 27)				
WETS001900	10/06/95	75.4	127	20.1

Notes:

U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram

**Table 20**  
**Wetland Excavation Final Confirmation Sample Analytical Results**  
**(Areas Confirmed Clean — See Figures 25, 26, 27, and 28)**

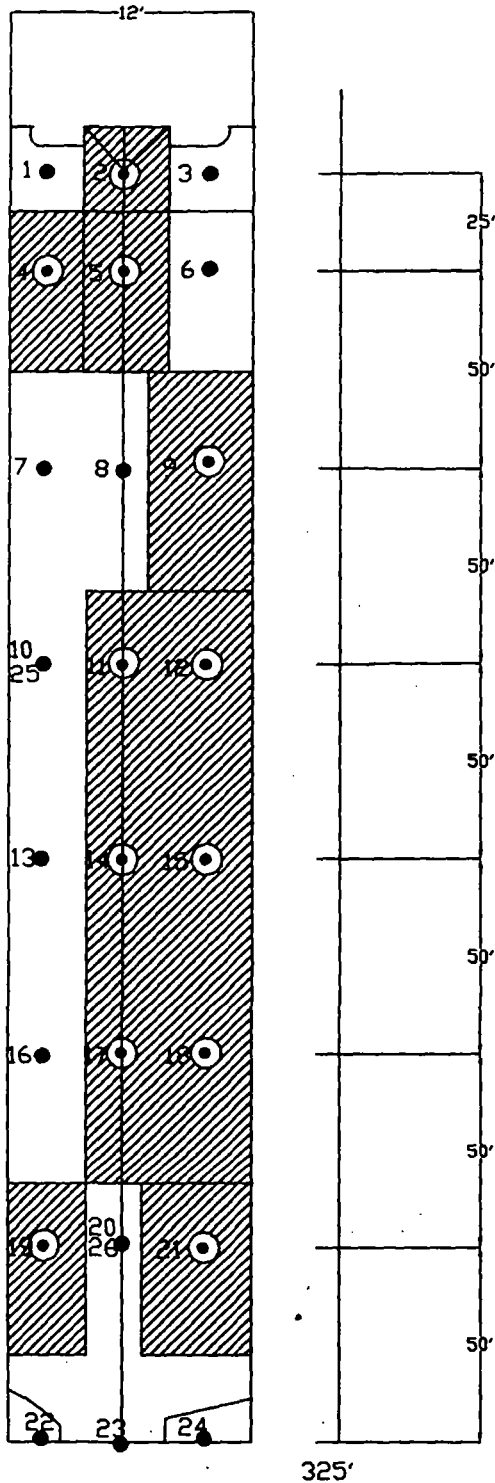
Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round (Figure 25)</b>				
WL-1		10.9	29.6	1.0 U
WL-3		9.0	22.1	1.0 U
WL-6	9/25/95	10.0	38.3	1.0 U
WL-7		1.0 U	10.1	1.0 U
WL-8		3.5	11.4	1.2
WL-10		39.6	44.9	2.7
WL-13		5.0	13.4	1.0 U
WL-16		35.6	44.3	1.6
WL-20		6.7	14.6	1.0 U
WL-22		1.0 U	16.2	1.0 U
WL-23		1.0 U	16.0	1.0 U
WL-24		1.2	13.3	1.0 U
WL-25*		4.9	16.8	1.0 U
WL-26*		10.5	19.6	1.0 U
<b>2nd Round (Figure 26)</b>				
WETS000100		1.6	18.0	10 U
WETS000200		54.8	84.3	10 U
WETS000400		14.3	7.6	10 U
WETS001000	10/03/95	1.0 U	27.9	10.0 U
WETS001100		58.4	68.7	10.0 U
WETC001300*		3.1	25.4	10.0 U

**Table 20**  
**Wetland Excavation Final Confirmation Sample Analytical Results**  
**(Areas Confirmed Clean — See Figures 25, 26, 27, and 28)**

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>3rd Round (Figure 27)</b>				
WETS001400		1.0 U	12.6	10.0 U
WETS001500		1.0 U	17.2	10.0 U
WETS001600	10/06/95	1.0 U	16.9	10.0 U
WETS001700		2.1	15.2	10.0 U
WETS001800		4.2	16.6	10.0 U
<b>4th (Final) Round (Figure 28)</b>				
WETS002000	10/10/95	1.0 U	12.7	1.0 U

**Notes:**

- \* — WL-25 is a field duplicate of WL-10.
- \* — WL-26 is a field duplicate of WL-20
- \* — WETC001300 is a field duplicate of WETS001000.
- U — Not detected; preceding number is reported limit.
- mg/kg — Milligrams per kilogram



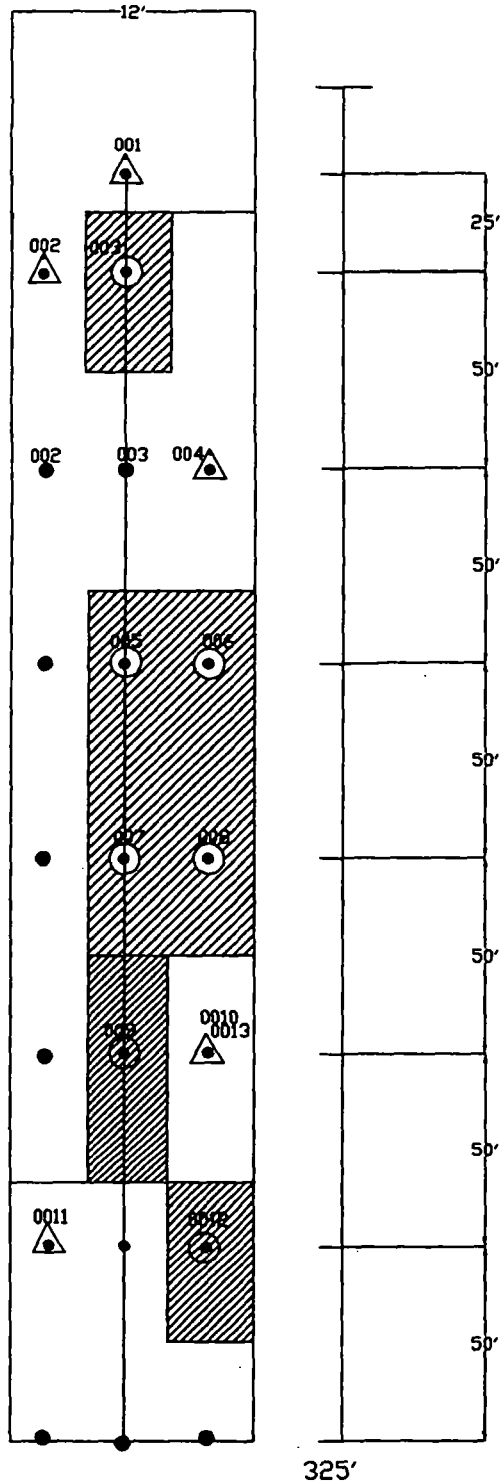
EXCAVATED AFTER FIRST ROUND

SAMPLE EXCEEDED CLEAN-UP CRITERIA

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FIGURE 25  
WETLANDS EXCAVATION CONFIRMATION  
SAMPLING - FIRST ROUND  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: JDF	DATE: 7/29/96	PROJECT NUMBER	REV
APPV'D:	FILE: 6916140F	6916-140-100	



- EXCAVATED AFTER SECOND ROUND  
 SECOND ROUND SAMPLES WHICH EXCEEDED CLEAN-UP CRITERIA  
 SECOND ROUND SAMPLES WHICH MET CLEAN-UP CRITERIA

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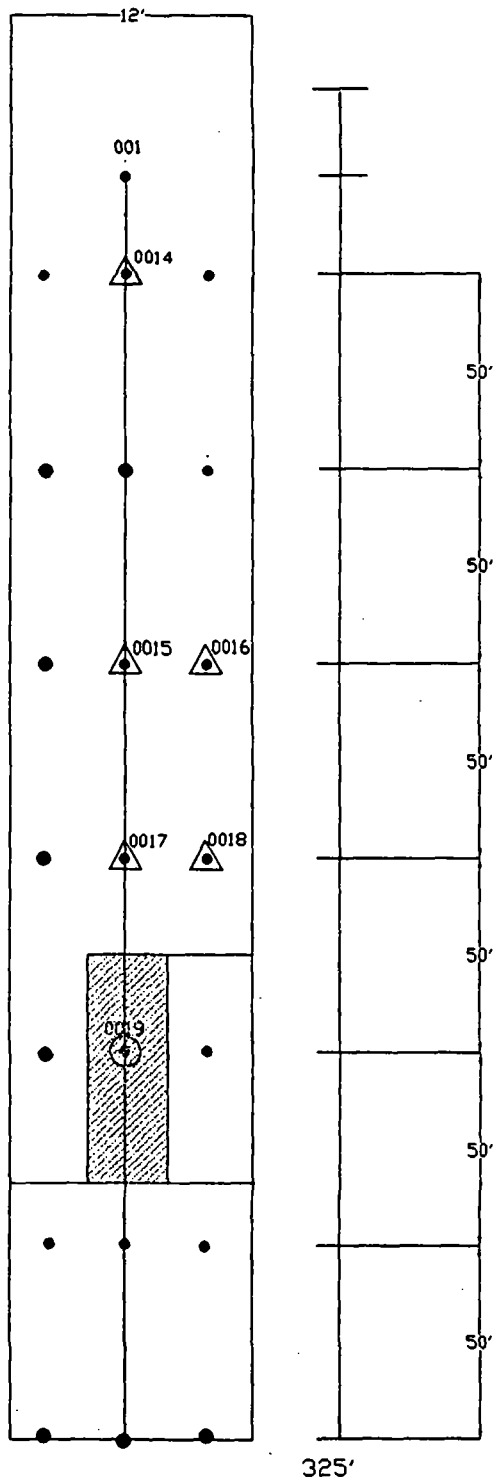
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FIGURE 26  
 WETLANDS EXCAVATION CONFIRMATION  
 SAMPLING - SECOND ROUND

United Technologies Auto.

Memphis, Tennessee

DRAWN: JDF	DATE: 7/29/96	PROJECT NUMBER	REV
APPV'D:	FILE: 6919140G	6916-140-100	



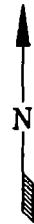
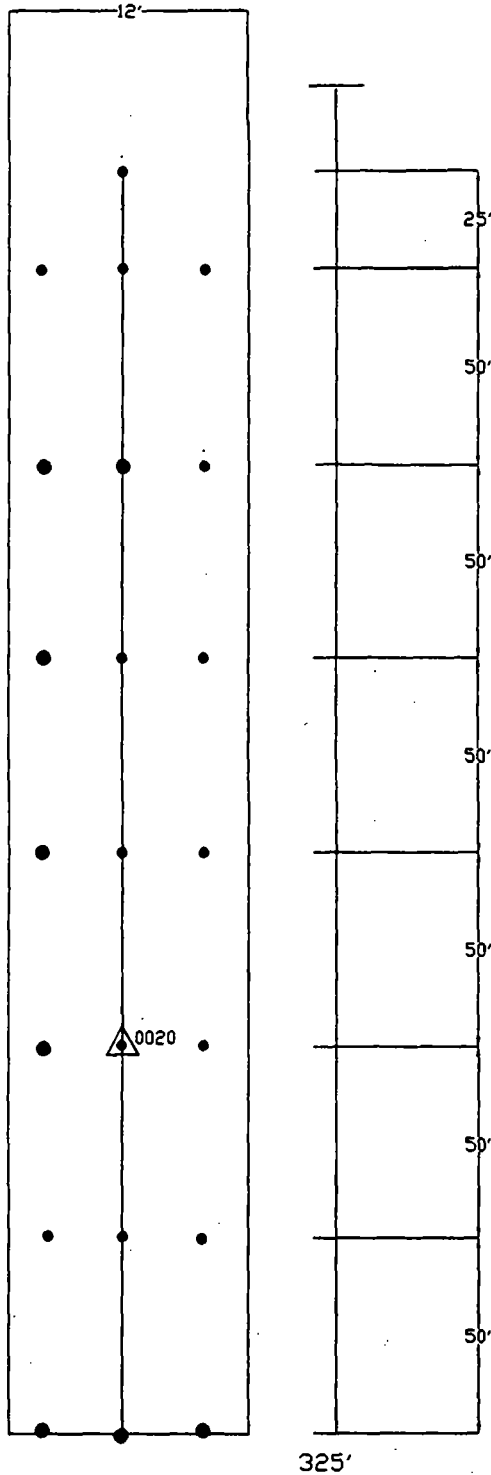
-  EXCAVATED AFTER THIRD ROUND
-  THIRD ROUND SAMPLES WHICH EXCEEDED CLEAN-UP CRITERIA
-  THIRD ROUND SAMPLES WHICH MET CLEAN-UP CRITERIA

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FIGURE 27  
WETLANDS EXCAVATION CONFIRMATION  
SAMPLING - THIRD ROUND  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: JDF	DATE: 7/29/96	PROJECT NUMBER	REV
APPV'D:	FILE: 6916140H	6916-140-100	

2 11 0056



△ FOURTH ROUND SAMPLES WHICH MET CLEAN-UP CRITERIA

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FIGURE 28  
WETLANDS EXCAVATION CONFIRMATION  
SAMPLING - FOURTH ROUND

United Technologies Auto.  
Memphis, Tennessee

DRAWN: JDF	DATE: 7/29/96	PROJECT NUMBER	REV
APPV'D:	FILE: 69161401	6916-140-100	



## Release of Lagoon Water to Wetlands

On October 19, 1995, a release of lagoon water to the wetlands was noticed to have occurred through a corrugated metal pipe in the northern dike, potentially due to a failure in the sump wall.

The potentially impacted area comprised approximately 225 linear feet of the outfall channel. The portion of the outfall channel affected extended from the northern dike to a small natural holding pond.

A sampling plan to verify the whether contaminants were present in this portion of the wetlands (which had not been sampled previously) was submitted to EPA, approved, and executed.

In accordance with the approved plan, five samples were collected at 50-foot intervals, with the initial sample point at the Lagoon 5 discharge to the wetlands. The additional samples were collected from the center of the creekbed at 50-foot intervals north, terminating at the natural pond (see Figure 20). Sediments were sampled to 6 inches bgs with a trowel. Each sample was analyzed for the following constituents:

- Total chromium
- Total cadmium
- Semivolatiles
- TPH

Analytical methods, sampling procedures, sample containers, sample preservation, and holding times were in conformance to the Removal Work Plan dated March 1995.

Analytical results for this sampling event are presented in Table 21. Laboratory analytical data sheets are included in Appendix A.

Table 21  
Potentially Impacted Wetland Sample Analytical Results  
(See Figure 29)  
11/03/95 Sampling Event

Sample I.D.	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)	Semivolatiles, mg/kg (8270B)
WETM000100	7.9	35.4	10.0 U	No semivolatile constituents were detected in any of the samples at concentrations greater than the detection limits.
WETM000200	81.7	186	10.1	
WETM000300	85.5	185	10 U	
WETM000400	44.5	162	10 U	
WETM000500	27.4	49.6	10 U	

**Notes:**

- U — Not detected; preceding number is reported limit.  
mg/kg — Milligrams per kilogram

The sampling event identified this previously unsampled portion of the wetlands as impacted, since cadmium was detected in two of the samples at higher concentrations than what would have resulted from deposition from the lagoon release. Removal activities to address this area were conducted the following summer, when conditions were dry enough to facilitate excavation.

In August 1996, ENSR excavated the impacted area north of Lagoon 5 (approximately 65 feet by 7 feet) to a total depth of approximately 2 feet. Results from the first round of confirmation sampling indicated that the area would require further excavation to meet cleanup levels. An additional 2 feet of soil were excavated from the area, and the area was resampled. Results from the second round of confirmation sampling indicated that the area had been excavated to below cleanup levels. Approximately 63 cubic yards of soil were removed. The excavation was then sloped to blend into existing terrain. Tables 22 and 23 present the results of the confirmation sampling.

**Table 22**  
**Wetland Excavation (August 1996) Initial Confirmation Sample Analytical Results**  
 (Area Requiring Further Excavation — See Figure 30)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>1st Round Sampling</b>				
WETM000102	8/10/96	186	882	5.4
WETM000202		149	171	2.7
WETM000302		2.0	9.2	1.0 U
WETM000402		156	271	9.5

**Notes:**

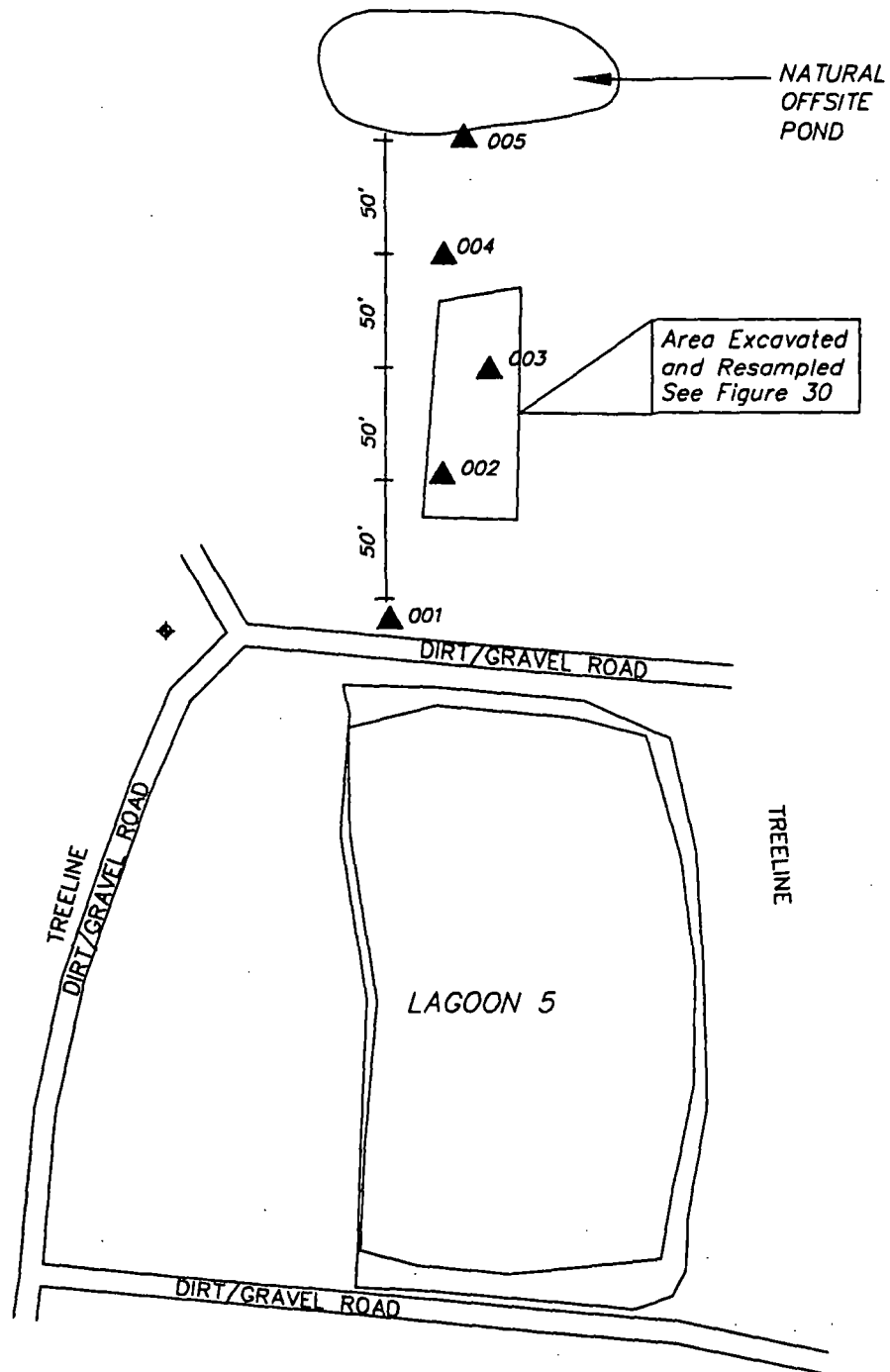
U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram

**Table 23**  
**Wetland Excavation Final Confirmation Sample Analytical Results**  
 (Area Confirmed Clean — See Figure 30)

Sample I.D.	Date Collected	Total Cadmium, mg/kg (6010A)	Total Chromium, mg/kg (6010A)	TPH, mg/kg (418.1MOD)
<b>2nd Round</b>				
WETS000124	8/17/96	2.8	8.5	10.0 U
WETS000224		1.0 U	7.2	10.0 U
WETS000324		1.0 U	7.4	10.0 U
WETS000424		1.0 U	7.7	10.0 U

**Notes:**

U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram

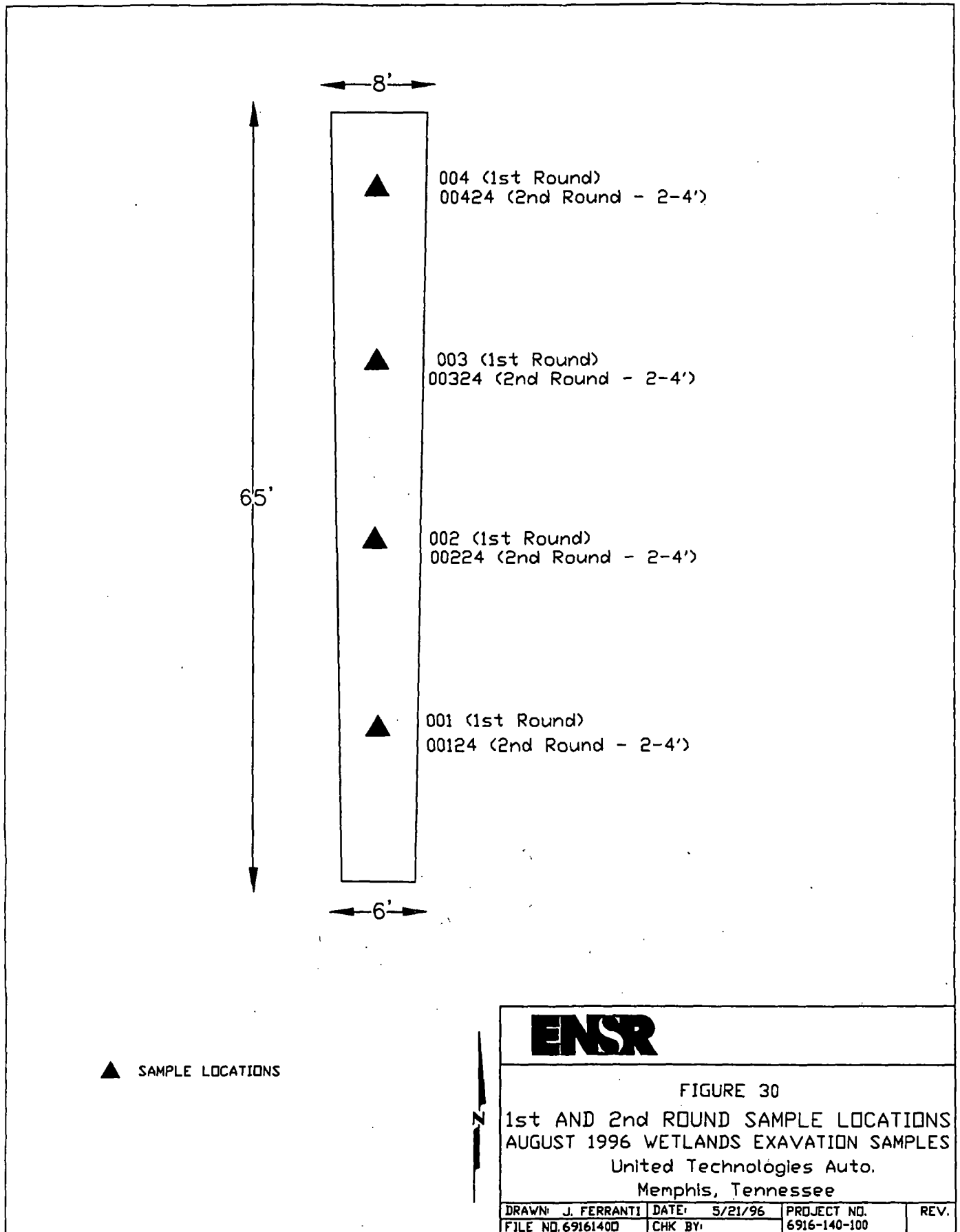


▲ SAMPLE LOCATION

**ENSR**

FIGURE 29  
WETLANDS POTENTIALLY IMPACTED BY  
RELEASE SAMPLE LOCATIONS  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: JDF	DATE: 5/22/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140L	CHK BY:		



### **Wetland Backfilling and Sampling**

As described previously, a storm water diversion ditch was installed onsite. On October 10, 1995, the excavation created during the wetlands removal action was backfilled with spoils from the west diversion ditch. The EPA OSC deemed the sampling frequency in the area insufficient to designate the soils suitable for backfill use. Therefore, a sampling plan to determine the appropriateness of the use of the west ditch spoils for backfill onsite was submitted to and approved by EPA and then executed.

The area in question was 325 feet by 12 feet by 4 feet, or approximately 520 cubic yards (with a 1.3 expansion factor) of material.

In accordance with the approved plan, two five-point composite samples were collected from within grids 50 feet by 12 feet (with one smaller end grid, 12 feet by 15 feet) at depth intervals of 0 to 2 feet and 2 to 4 feet. Seven grids were sampled, yielding 13 samples (only one sample was collected from the smaller end grid), which was approximately one sample per 28.5 cubic yards of material. Each sample was analyzed for the following parameters:

- Total Resource Conservation and Recovery Act (RCRA) metals
- TPH
- Base-neutral/acid extractable organic compounds (BNAs)

Analytical methods, sampling procedures, sampling containers, sampling preservation, and holding times were in conformance to the Removal Work Plan.

Analytical results for this sampling event are presented in Table 24. Laboratory analytical data sheets are included in Appendix A. The results indicated that the fill material was well below cleanup criteria for the site.

Table 24  
 Wetland Backfill Material Sample Analytical Results  
 12/11/95 Sampling Event

Sample Designation and Concentration in ppm							
Parameter	BKFS000102	BKFS000202	BKFS000204	BKFS000302	BKFS000304	BKFS000402	BKFS000404
Cadmium (6010A)	4.4	12.1	13.2	4.1	1.8	1.0 U	8.3
Chromium (6010A)	18.8	29.7	22.6	14.7	16.2	14.8	20.8
Arsenic (6010A)	3.2	5.2	2.7	3.3	1.0 U	3.7	3.5
Barium (6010A)	82.6	96.0	124	76.7	132	69.7	87.3
Lead (6010A)	10.2	11.8	10.9	9.0	9.4	8.9	9.6
Mercury (7471)	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Selenium (6010A)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Silver (6010A)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TPH (418.1MOD)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Semivolatiles (8270B)	No semivolatile constituents were detected at concentrations exceeding the detection limits in any sample.						

**Note:**

U — Not detected; preceding number is reported limit.

Table 24  
 Wetland Backfill Material Sample Analytical Results  
 12/11/95 Sampling Event

Sample Designation and Concentration in ppm							
Parameter	BKFC000402*	BKFS000502	BKFS000504	BKFS000602	BKFS000604	BKFS000702	BKFS000704
Cadmium (6010A)	11.9	4.0	7.7	7.0	7.7	4.9	21.8
Chromium (6010A)	19.6	16.1	12.3	17.5	25.9	19.1	32.3
Arsenic (6010A)	2.9	4.0	3.4	3.0	2.8	3.3	3.6
Barium (6010A)	70.6	76.7	107	61.1	80.6	78.5	105
Lead (6010A)	9.8	9.6	8.6	8.2	8.1	9.3	10.2
Mercury (7471)	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Selenium (6010A)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Silver (6010A)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
TPH (418.1MOD)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Semivolatiles (8270B)	No semivolatile constituents were detected at concentrations exceeding the detection limits in any of the samples.						

**Notes:**

- \* — BKFC000402 is a field duplicate of BKFS000402.
- U — Not detected; preceding number is reported limit.

2 11 0063

## 2.7 Solvent Odor Soils

On November 8, 1995, a sweet solvent odor was encountered from soil excavated from the diversion ditch between Lagoons 2 and 3, in an area where drums had been removed from Lagoon 3. To assess whether these soils were impacted by solvents or other constituents unrelated to the sludges, a five-point composite sample was collected from the stockpile of excavated soil for analysis for VOCs, TPH, total RCRA metals, BNAs, hexavalent chromium, reactive cyanide, and reactive sulfide. Analytical results from this sample are presented in Table 25.

On November 14, 1995, the floor and one sidewall of the excavation between Lagoons 2 and 3 were sampled. A five-point composite sample was collected from the excavation floor and split with the TAT representative. In addition, a grab sample was collected from the south sidewall from a depth of between 1 and 2 feet. These two samples were analyzed for TPH, total cadmium, chromium, lead, hexavalent chromium, and semivolatile constituents. Analytical results from these samples are presented in Table 26.

**Table 25**  
**Excavated Soil from the Diversion Ditch Analytical Results**  
**11/8/95 Sampling Event**

**Sample Designation and Concentration in mg/kg**

<b>Parameter</b>	<b>VOCS000100</b>
Cadmium (6010A)	1.0 U
Chromium (6010A)	15.4
Chromium, hexavalent (7197)	10.0 U
Arsenic (6010A)	5.4
Barium (6010A)	71.4
Lead (6010A)	14.1
Mercury (7471)	0.10 U
Selenium (6010A)	1.0 U
Silver (6010A)	1.0 U
TPH (418.1MOD)	78.7
Reactive Cyanide	2.0 U
Reactive Sulfide	2.0 U
Volatile Organic Compounds (8240B)	No volatile constituents were detected above the reported limits.
Semivolatiles (8270B)	No semivolatile constituents were detected above the reported limits.

**Notes:**

U — Not detected; preceding number is reported limit.  
mg/kg — Milligrams per kilogram



**Table 26**  
**Excavation Floor and Sidewall Sample Analytical Results**  
**11/14/95 Sampling Event**

Parameter	Sample Designation and Concentration in mg/kg	
	EX1S000100	EX1S000202
Cadmium (6010A)	1.0 U	1.0 U
Chromium (6010A)	5.0	5.4
Chromium, hexavalent (7197)	10.0 U	10.0 U
Lead (6010A)	6.7	5.6
TPH (418.1MOD)	10.0 U	36.3
Semivolatiles (8270B)	No semivolatile constituents were detected above the reported limits.	

**Notes:**

U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram

Analytical results from diversion ditch between Lagoons 1 and 2, including both excavated soil as well as the excavation bottom and sidewall, indicate that the area was not impacted by constituents at concentrations above the established cleanup levels.

## 2.8 Soil Removal Associated with Fuel Lines

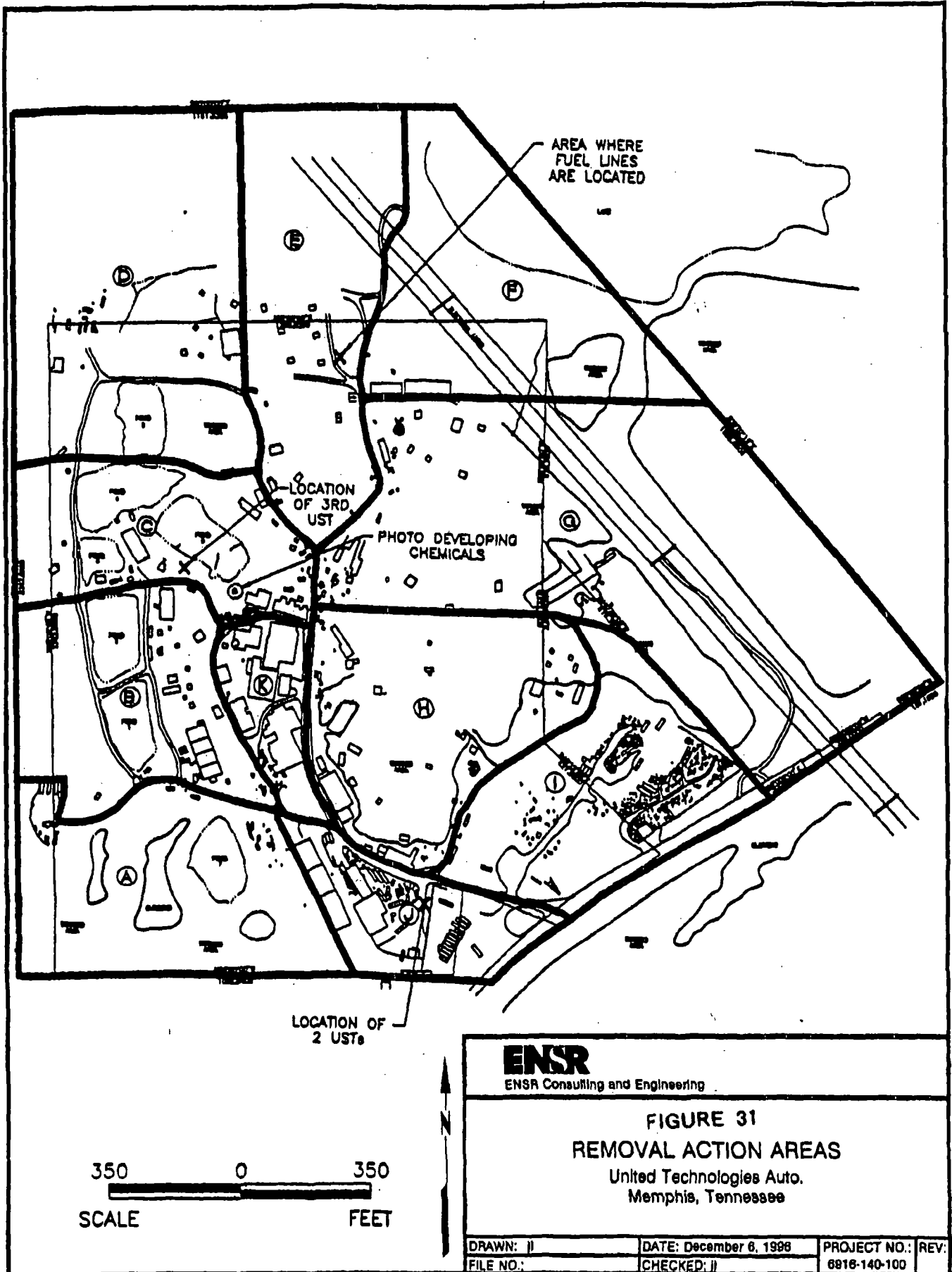
ENSR mobilized to the site on April 29, 1996, to excavate and remove TPH-contaminated soil associated with leaking fuel oil lines. ENSR excavated approximately 30 cubic yards of TPH-impacted soil and removed associated sections of product piping. Figure 31 shows the location of the TPH-impacted soil removal action. The first round of confirmation sampling indicated that additional soil needed to be removed to meet the cleanup criteria (100 ppm). The excavated area was extended to the west and south, and an additional 1 foot in depth. Analytical results from confirmation samples indicated that the cleanup criteria have been met. Tables 27 and 28 present the results of each round of confirmation sampling.

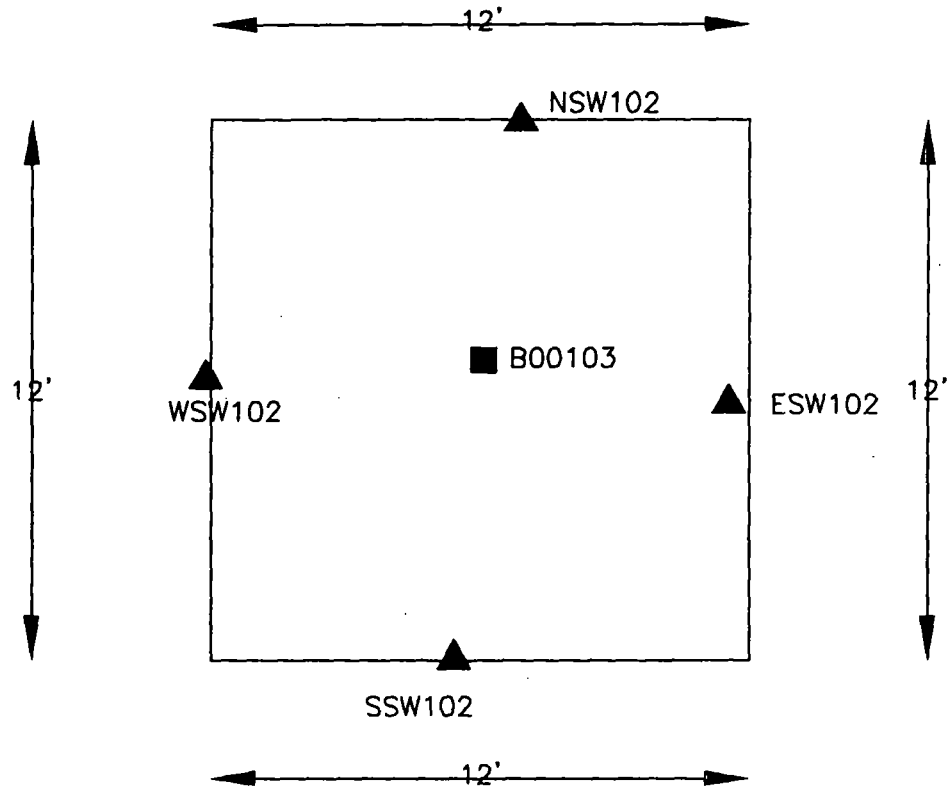
**Table 27**  
**TPH-Impacted Soil Removal Confirmation Sample Analytical Results**  
**(Areas Requiring Further Excavation — See Figure 32)**

Sample I.D.	Date Collected	TPH, mg/kg (418.1MOD)
<b>1st Round</b>		
UTASB00103		168
UTASWSW102	4/30/96	4,600
UTASSSW102		512

**Notes:**

U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram





- BOTTOM SAMPLE (AT 3' DEPTH)
- ▲ SIDEWALL SAMPLE (AT 2' DEPTH)

**ENSR**

FIGURE 32  
1st ROUND SAMPLE LOCATIONS  
TPH- Impacted Soil Excavation  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: J. FERRANTI	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140M	CHK BY:		

**Table 28**  
**TPH-Impacted Soil Removal Confirmation Sample Analytical Results**  
**(Areas Confirmed Clean — See Figures 32 and 33)**

Sample I.D.	Date Collected	TPH, ppm (418.1 MOD)
1st Round (Figure 32)		
UTASNSW102	4/30/96	83.1
UTASESW102		15.9
2nd Round (Figure 33)		
UTASB00204	5/1/96	1.0 U
UTASWSW202		1.0 U
UTASSSW202		1.0 U

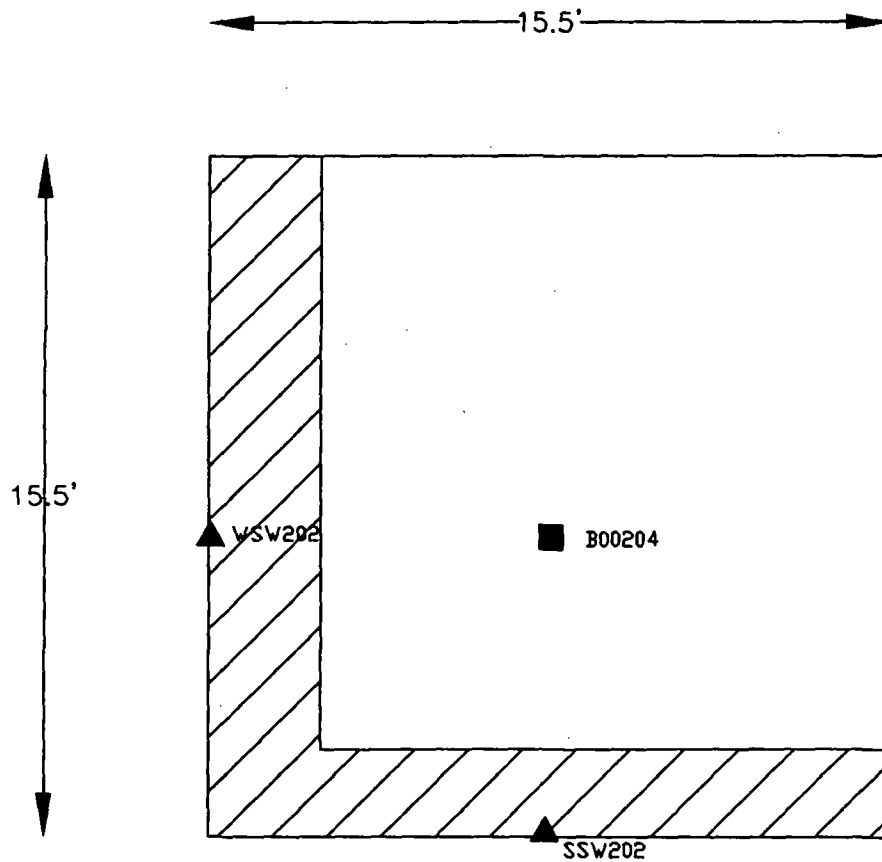
**Note:**

U — Not detected; preceding number is reported limit.

The shallow excavation was then sloped to blend into existing terrain. Excavated soil was placed into two solid rolloff boxes, and the boxes were secured (covered with plastic) to preclude storm water contact. ENSR decontaminated equipment and demobilized from the site the evening of May 1, 1996.

## 2.9 UST Removal

ENSR removed two collocated tanks which were believed to store gasoline and diesel but contained no residual product, and one acetone tank near Lagoon 6 which contained approximately 900 gallons of acetone. Figure 31 shows the locations of the excavated tanks. After sampling and characterizing the contents of residuals left in the tanks, ENSR removed the acetone for recycling and then triple-rinsed all tanks. The rinsate was removed for disposal. Copies of manifests for the acetone and rinsate are included in Appendix E. The tanks were then rendered inert, excavated, removed from the excavation, labeled, and salvaged by A&M Contracting of Memphis (receipts are included in Appendix E). Excavated soils were monitored for potential impacts; a small quantity of TPH-impacted soil excavated from around the diesel tank was segregated. After removal of the tanks, the two excavations were sampled in accordance with the Removal Work Plan Addendum. One soil sample from below the diesel tank indicated that additional TPH-impacted soil would require removal. After additional excavation, the TPH-impacted soil was transferred to a covered rolloff and secured onsite pending approval for disposal. Due to quality control concerns with the original samples from the acetone tank excavation, all excavations were resampled, and these results indicated that all areas were below the established removal goals. Tables 29 through 31 present the results of the each set of confirmation sampling.



■ BOTTOM SAMPLE (AT 4' DEPTH)

▲ SIDEWALL SAMPLE (AT 2' DEPTH)

▨ ADDITIONAL SOIL EXCAVATED  
(TOTAL 14 CY ADDITIONAL SOIL)

**ENSR**

FIGURE 33

2nd (final) ROUND SAMPLE LOCATIONS  
TPH- Impacted Soil Excavation  
United Technologies Auto.  
Memphis, Tennessee

DRAWN: J. FERRANTI	DATE: 5/21/96	PROJECT NO. 6916-140-100	REV.
FILE NO. 6916140N	CHK BY:		

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Table 29(a)  
 UST Excavation Cleanup Confirmation Results  
 Gasoline Tank Excavation

Constituent	Date Collected	UTASUST001	UTASUST002
1st Round Sampling			
BTEX, mg/kg (8020)	7/25/96	0.10 U	10.0 U
TPH, mg/kg (418.1 MOD)		0.10 U	10.0 U

**Notes:**

BTEX — Benzene, toluene, ethylbenzene, and xylene  
 U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram

Table 29(b)  
 UST Excavation Cleanup Confirmation Results  
 Diesel Tank Excavation

Constituent	Date Collected	UTASUST003	UTASUST004	UTAUST005
1st Round Sampling				
PAH, mg/kg (8270)	7/25/96	0.33 U	0.33 U	Fluoranthene: 0.45 Pyrene: 0.35 All other: .033 U
TPH, mg/kg (418.1 MOD)		10.0 U	106	124

**Notes:**

PAH — Polyaromatic hydrocarbons  
 U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram

OSC — 61 Industrial Park Site  
 Memphis, Tennessee  
 May 2, 1997

Table 29(c)  
 UST Excavation Cleanup Confirmation Results  
 Gasoline Tank Excavation

Constituent	Date Collected	UTASUST011	UTASUST012
2nd Round Sampling			
BTEX, mg/kg (8020)	7/29/96	0.10 U	10.0 U
TPH, mg/kg (418.1 MOD)		0.10 U	12.1

**Notes:**

BTEX — Benzene, toluene, ethylbenzene, and xylene  
 U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram

Table 29(d)  
 UST Excavation Cleanup Confirmation Results  
 Diesel Tank Excavation

Constituent	Date Collected	UTASUST013	UTASUST014	UTAUST015*
2nd Round Sampling				
PAH, mg/kg (8270)	7/25/96	0.33 U	0.33 U	Fluoranthene: 0.45 Pyrene: 0.35 All other: .033 U
TPH, mg/kg (418.1 MOD)		50.8	10.0 U	10.0 U

**Notes:**

\* — UTAUST015 was a sample collected from the stockpile of excavated soil for waste characterization purposes. At BFI's request, this sample was further analyzed for priority metals, volatiles, and PCBs. Indicated that the soil was not a hazardous waste.  
 PAH — Polyaromatic hydrocarbons  
 U — Not detected; preceding number is reported limit.  
 mg/kg — Milligrams per kilogram

Table 30(a)  
 UST Excavation Cleanup Confirmation Results  
 Acetone Tank Excavation

Constituent	Date Collected	UTASUST006	UTASUST007	UTASUST008	UTASUST009	UTASUST0D9
1st Round Sampling						
Volatiles, ppm (8240)		0.005 - 0.010 U	0.005 - 0.010 U	0.005 - 0.010 U	0.005 - 0.010 U	0.005 - 0.010 U
Semivolatiles, ppm (8270B)	7/25/96	Di-n-butylphthalate: 1.96 All others: 0.33 - 0.83 U	Di-n-butylphthalate: 1.98 All others: 0.33 - 0.83 U	Di-n-butylphthalate: 1.52 All others: 0.33 - 0.83 U	Di-n-butylphthalate: 1.97 All others: 0.33 - 0.83 U	Di-n-butylphthalate: 1.58 All others: 0.33 - 0.83 U

**Note:**

U — Not detected; preceding number or range of numbers is reported limit or range of limits.

2 1 1 0072



Table 30(b)  
 UST Excavation Cleanup Confirmation Results  
 Acetone Tank Excavation

Constituent	Date Collected	UTASUST016	UTASUST017	UTASUST018	UTASUST019	UTASUST19D*
2nd Round Sampling						
Volatiles, ppm (8240)	7/29/96	0.005 - 0.010 U	0.005 - 0.010 U	0.005 - 0.010 U	0.005 - 0.010 U	0.005 - 0.010 U
Semivolatiles, ppm - (8270B)		0.33 - 0.83 U	0.33 - 0.83 U	0.33 - 0.83 U	0.33 - 0.83 U	0.33 - 0.83 U

**Notes:**

U — Not detected; preceding number or range of numbers is reported limit or range of limits.

\* — UTASUST19D is a field duplicate of UTASUST19.

## 2.10 Plating Line Decontamination

ENSR decontaminated a plating line, removing debris and residuals from the process tanks, removing wood supports that had been impacted, and rinsing tanks and lines. The decontaminated process equipment was left onsite for salvaging. Seven drums of contaminated sludge and debris were generated and disposed of at Chemwaste's Emelle, Alabama, facility by Perma-Fix Environmental Services (a treatment, storage and disposal facility, and waste-brokering firm). A copy of the manifest is included in Appendix E.

## 2.11 Photodeveloping Chemicals

In August 1996, ENSR submitted a plan to EPA to address seven 2-quart containers (one of which was cracked and triple-bagged with absorbent material) and a 1-quart container of photo-developing chemicals remaining onsite. Figure 31 shows the location of the chemicals. Based on inspection of the containers and review of the MSDSs provided by EPA, it appeared that the seven larger vessels contained Cernex and the smaller vessel contained Cronex NDT (both Du Pont trade names), which consist of primarily acetic acid and other acidic chemicals.

On October 9, 1996, ENSR mixed these chemicals with caustic reagents (LKD, cement kiln dust, fly ash, fluidized bed ash) remaining from the treatability studies to neutralize the acids. Mixing was conducted in a 30-gallon container. After allowing the mixture to solidify, ENSR collected two characterization samples: a composite sample to be analyzed for semivolatiles, metals, and PCBs; and a grab sample for volatiles analysis. Tables 31(a) and (b) presents the results of these analyses. Upon receiving authorization to dispose of the solidified waste from TDEC, ENSR transported and disposed of the waste at BFI's South Shelby Landfill.

Table 31(a)  
 Neutralized Photodeveloping Chemicals Analytical Results  
 Composite Sample, PHDVCP0100

Constituent	Date Collected	Concentration (Total, mg/kg)
Antimony		9.9 U
Arsenic		10.7
Barium		175
Beryllium	10/17/96	1.0 U
Cadmium		2.8
Chromium		12.7
Copper		15.1
Lead		14.5

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 May 2, 1997

**Table 31(a)**  
**Neutralized Photodeveloping Chemicals Analytical Results**  
**Composite Sample, PHDVCP0100**

Constituent	Date Collected	Concentration (Total, mg/kg)
Mercury		0.10 U
Nickel		48.5
Selenium		0.99 U
Silver		1.0 U
Thallium		1.0 U
Zinc	10/17/96	49.1
Semivolatiles		0.33 - 0.83 U
PCBs		0.0333 - 0.0666 U

**Notes:**

U — Not detected; preceding number or range of numbers is reported limit or range of reported limits.  
 mg/kg — Milligrams per kilogram

**Table 31(b)**  
**Neutralized Photodeveloping Chemicals Analytical Results**  
**Grab Sample, PHDVG00100**

Sample I.D.	Date Collected	Concentration (Total, mg/kg)
Volatiles, ppm (8240)		Benzene: 0.080 Ethylbenzene: 0.016 2-Hexanone: 0.120 4-Methyl-2-pentanone: 4.17 Styrene: 0.008 Toluene: 0.066 Xylenes: 0.092 All others: 0.005 - 0.010 U
	10/17/96	

**Notes:**

U — Not detected; preceding number or range of numbers is reported limit or range of reported limits.  
 mg/kg — Milligrams per kilogram

### 3.0 DISPOSAL ACTIVITIES

#### 3.1 Drummed Material

Disposal activities began February 19, 1996. Advanced Environmental Technical Services (AETS) of Millington, Tennessee, was selected by the Lazarov Brothers to dispose of all the drummed material. The letter approving AETS, to dispose of this material is included in

Appendix D. AETS proposed to receive the waste at its Millington facility and tranship the materials to other AETS-owned facilities for final disposal. The following is a list of the approved facilities and their disposal methods:

**AETS**

EPA No. TND000772186

5485 Tay-For Drive

Millington, TN 38053

Disposal Method: Temporary storage and tranship

**Chemical Waste Management**

EPA No. ALD00622464

Highway 17 North, Mile Marker 163

Emelle, AL

Disposal Method: Direct landfill, stabilization and landfill

**Chemical Waste Management/Resource Recovery**

EPA No. GAD09662982

5371 Cook Road

Morrow, GA 30260

Disposal Method: Liquid and solid fuels processing and blending

**Chemical Waste Management/Trade Waste Incineration**

EPA No. ILD098642424

7 Mobile Avenue

Sauget, IL 62201

Disposal Method: Incineration

**Waste Management/WMX Technology**

Prairie Bluff Sanitary Landfill and Recycling Center

1649 Highway 15 North

Houston, MS 38851

Disposal Method: Landfill and recycling nonhazardous materials

Disposal profile analytical results from ESC were submitted to AETS for approval. Copies of these analytical data are in Appendix A. Each category was placed in one of 11 wastestreams, and a profile was written for each wastestream. Table 32 describes the wastestreams and how many drums were in each.

**Table 32**  
**Drummed Wastestreams**

Wastestream ID	Description	# of Drums
BW4701	Acid Liquid	8
BW4702	Acid Sludge	2
BW4704	Inorganic Solids	41
BW4705	Nonhazardous, Inorganic Solids	18
BW4706	Organic Solids	90
BW4707	Organic Sludges and Liquids	219
BW4708	Cyanide, Cadmium Liquid	37
BW4709	Cyanide Solid	1
BW4710	PCB Transformers	2
BW4711	Lab Packs	23
BW4712	Oxidizer	1
BW4713	Lab Trash	3
BW4716	Peroxide	3

In all, 422 drums were recovered from the field and disposed of by AETS. Another 82 drums recovered from the field were categorized as base neutrals. These materials had no hazardous characteristics, and analytical data showed this material was not a threat to human health or the environment. Sixty-four of the base neutral drums were liquid used for dust suppression onsite. The other 18 were solids, and were disposed with the personal protective equipment (PPE) and the asbestos brake shoes at Browning-Ferris Industries (BFI) South Shelby Landfill in Memphis, Tennessee. The disposal of these materials is discussed further in Section 3.7.

Two of the wastestreams — another 26 drums — were created during the investigation. Wastestream BW4711 was composed of the materials remaining from the samples that were collected from the drums to facilitate hazcatting and disposal profile sampling. These materials were lab-packed by AETS and disposed of with the drummed material. The trash produced in the laboratory during hazcatting and compatibility testing was placed in three drums. AETS collected a representative sample from these drums. AETS reviewed the analytical data, a profile was developed, and the trash was also disposed of with the drummed material. This trash generated Wastestream BW4713, bringing the total number of drummed wastestreams to 13. Copies of the Hazardous Waste Manifests, the Land Disposal Notification and Certification Forms, Lab Pack Land Disposal Certifications, and the Lab Pack Drum Inventories, can be found in Appendix E.

Upon completion of the drummed material disposal and during the soil disposal activities, two confirmation samples (HWC1041111 and HWC1041112) were collected from the drum-staging area. Both samples contained contamination above cleanup levels. Approximately 6 inches of soil were excavated from the drum-staging area and two additional confirmation samples were collected (HW61041711 and HW61041712). Results for the second round of samples were below cleanup levels. All analytical results from the drum-staging area are included in Appendix A.

### **Plating Line Decontamination Sludge and Debris**

Seven drums of contaminated sludge and debris were generated during the plating line decontamination. This material was disposed of at Chemwaste's Emelle, Alabama, facility by Perma-Fix Environmental Services. A copy of the manifest is included in Appendix E.

## **3.2 Soil Disposal**

### **Soils Associated with Drummed Material**

A representative sample collected from the excavated dirt stockpiles (61ST000101) was sent to ESC for disposal analysis. Another sample collected from the paint waste stockpile (61ST000201) was run separately for disposal analysis to ensure proper disposal of this waste. Both stockpile samples were nonhazardous and were accepted by BFI. Analytical results can be found in Appendix A. The letter granting approval from EPA, and the special waste approval letter from the TDEC are included in Appendix D.

Soil transport began on April 1, 1996, and concluded on April 24, 1996. A total of 6,039.75 tons of soil were hauled to and disposed at the BFI South Shelby Landfill. After transporting the stockpiles to the landfill, confirmation samples were collected in that area. Additional excavation and hauling occurred at locations where contamination was above cleanup concentrations. Analytical results are in Appendix A. During this second round of excavation, soil was loaded directly into trucks and taken to the landfill. Copies of the Nonhazardous Special and Asbestos Waste Manifests for the soil are in Appendix E.

Figures 15 to 23 in Section 2.5 show stockpile locations and analytical results.

### **Soils Associated with Fuel Lines**

One composite soil sample obtained from the excavated soil was analyzed for disposal characterization. Table 33 presents the analytical results for the waste characterization of the excavated soil.

**Table 33**  
**TPH-Impacted Soil Characterization Analytical Results**

Sample I.D.	Date Collected	TCLP TPH (1311/8015), mg/kg	TCLP Benzenes (1311/8020), mg/kg	TPH (418.1 MOD), mg/kg
UTASBOX100	4/30/96	0.10 - 0.11 U	0.100 U	NA
UTASBOX200		NA	NA	2,330

**Notes:**

UTASBOX100 and UTABOX200 are both composite samples from the solid rolloff box; UTASBOX100 was analyzed for TCLP TPH and benzenes, and UTASBOX200 was analyzed for TPH.

U — Not detected; preceding number is quantitation limit.

NA — Not analyzed.

mg/kg — Milligrams per kilogram

ENSR prepared and submitted wastestream approval forms to the Tennessee Department of Environment and Conservation (TDEC) for approval. TDEC approved disposal of the impacted soil in a letter dated May 30, 1996. Copies of the manifests are provided in Appendix E.

### 3.3 Tankers Containing Roofing Tar

Twelve tankers were onsite, two of which were empty. The other 10 contained roofing tar or its residue. A representative sample (61DVT00101) collected from the contents of these 10 tankers was submitted to ESC for analysis (Appendix A). A second sample was collected and analyzed to compare all necessary parameters for disposal. The analytical results were submitted to BFI and the material was accepted for disposal. A letter requesting approval for disposal of the tankers at the BFI North Shelby Landfill, and the letter granting approval by EPA, are included in Appendix D.

The insulation and the roofing tar in the tankers were sampled for asbestos analysis. One composite sample of the roofing tar was submitted to Williams and Associates, Inc., of Memphis, Tennessee, for asbestos analysis. The results were negative. Eleven of the tankers contained insulation. The first sample of tanker insulation tested positive for asbestos and an identical tanker also was considered positive. The other nine were negative for asbestos. Analytical results are included in Appendix A. The two tankers that contained asbestos were wrapped with plastic sheeting, properly labeled, and manifested prior to transportation to the landfill. The 10 tankers containing roofing tar were transported to the landfill on May 13 and 14, 1996. Nonhazardous Special and Asbestos Waste Manifests for the tankers are included in Appendix E.

### 3.4 Battery Disposal

A large number of Zinc Carbonaire marine batteries were onsite. The batteries were in three separate areas of the site; most were contained in large wooden crates and were wrapped in plastic bags. Three different varieties of the Zinc Carbonaire batteries were identified. An MSDS for each type is included in Appendix H.

A representative sample from each type of Zinc Carbonaire battery was collected for analysis by ESC. Analytical results can be found in Appendix A. The results were submitted to AETS and approval for disposal was granted. A letter approving AETS' for disposal of these batteries is included in Appendix D.

The marine batteries were loaded and transported to AETS' Emelle, Alabama, facility between May 9 and 16, 1996. A total of 98.08 tons of marine batteries were transported. Alabama Hazardous Waste Manifests, Land Disposal Notification Forms, and Underlying Hazardous Constituent Forms can be found in Appendix E. Upon removal of the marine batteries, representative soil samples were collected from the areas where they were stored. Analytical constituents were specified by the OSC. The analytical results were forwarded to EPA, and contaminant concentrations were deemed below the OSC's cleanup levels (Appendix A).

Approximately 100 lead-acid batteries were located throughout the site. During removal activities these batteries were staged at the drum-staging area. Murphy Environmental Services of Memphis, Tennessee, took these batteries to Refined Metals in Memphis, Tennessee, for recycling in August 1996.

### 3.5 Slag Disposal

A representative slag sample collected from the stockpile was sent to ESC for disposal analysis (Appendix A). These results were forwarded to AETS, and the slag was accepted for disposal at its Emelle facility. The approval letter from EPA is in Appendix D. Approximately 98 tons of slag were hauled to Emelle on May 22 and 23, 1996. The Alabama Hazardous Waste Manifests are included in Appendix E.

### 3.6 Cylinders and Freon Tanks

Twelve cylinders were in the Kerr Brothers yard. Action Welding Supply Co., Inc., picked up two 33-pound propane cylinders; one 100-pound propane cylinder; two No. 2 oxygen cylinders; one 100-pound, truck-mounted propane cylinder; one 20-pound propane cylinder; one B type acetylene tank; one small acetylene tank; and three refrigerant tanks on May 1, 1996. A copy of the receipt from Action Welding is included in Appendix E.



Seventy-eight disposable R22 Freon tanks were in Zone K. The tanks were transported to ELW Refrigerant Reclamation in Evansville, Indiana, via Yellow Freight System, Inc., on June 11, 1996, for recycling. A copy of the Yellow Freight bill of lading is included in Appendix E.

### **3.7 Asbestos-Containing Brake Shoes, PPE, and Base Neutral Solids**

The asbestos-containing brake shoes that were in the dilapidated building in Zone C, all PPE that was generated by EnSafe and its subcontractors, and the base neutral solids were placed in a solid rolloff provided by BFI. The asbestos brake shoes were double-bagged and labeled "asbestos." The PPE was placed in garbage bags, and the base neutral drums were emptied into the solid rolloff. Analytical results of the brake shoes and base neutrals were forwarded to BFI and disposal was granted at the South Shelby Landfill. A copy of the analytical results for the brake shoes and base neutrals is included in Appendix A. A representative sample collected from the PPE was sent to BFI for approval. The PPE was also approved and the solid rolloff was transported to the landfill on June 6, 1996. A copy of the Nonhazardous Special and Asbestos Waste Manifest is also included in Appendix E.

### **3.8 Buried Debris**

On August 12, 1996, ENSR discovered buried debris in the corner of Lagoon 4. EnSafe mobilized to the site and collected a representative sample of the debris. The sample was analyzed for hazardous characteristics specified by the OSC. Analytical results showed no constituents above background levels, and were forwarded to the OSC. The OSC determined the material could be left in place. Analytical results are in Appendix A.

### **3.9 Waste Oils and Asbestos Insulation**

In December 1996, the U.S. Coast Guard discovered some unused and possibly asbestos-containing insulation stored onsite. EnSafe collected a sample of the insulation for asbestos analysis. The analytical results were positive (Appendix A). AETS double-bagged the insulation, vacuumed the area with a high-efficiency, particulate-arresting vacuum, and the material was sent to BFI's South Shelby Landfill for disposal. A copy of the Nonhazardous Special and Asbestos Waste Manifest is included in Appendix E.

A maintenance shop onsite contained some new and used automotive fluids (oils, antifreeze, engine treatment, etc.). When the drummed waste was originally removed, the maintenance shop was still operating. These materials were part of the operation and were not considered a waste. However, since then the maintenance worker retired and the shop became dormant. The OSC determined that this material was now a waste and required disposal. AETS was subcontracted to package, transport, and dispose of this material. In January 1997, AETS sampled the oil to

determine if PCBs were present. All results were negative and the material was removed on January 31, 1997. Analytical results are in Appendix A and a copy of the Hazardous Waste Manifest is in Appendix E.

#### **4.0 SUMMARY**

During removal activities, approximately 6,000 cubic yards of soil, 39,400 cubic yards of stabilized lagoon sludge, 2,600 drums, 100 tons of slag, 100 tons of marine batteries, and various other chemicals and hazardous waste were from 61 Industrial Park. This work was completed by two separate PRPs working in conjunction toward one main goal — the completion of the UAO. EPA completed a final walk-through in January 1997. Based on analytical results, the lagoons and soil have been excavated to below cleanup levels, and all known hazardous materials have been removed from the site.

#### **5.0 ACTIVITIES CONDUCTED UNDER THE AOC**

The remainder of the removal action conducted by UTA was conducted under an AOC between UT Automotive and EPA, dated April 10, 1996. A description of the site activities, the analytical results and data validation from all sampling events, and the nonhazardous waste manifests/weigh tickets for the treated sludge disposed of offsite are contained in the *Removal Action under the Administrative Order of Consent Final Report* (ENSR Document No. 6916147R01).

##### **Discharge to the POTW**

Lagoons 1, 2, and 3 were confirmed clean in accordance with the June 1995 RAP, and discharge from these detention ponds was rerouted to the diversion ditch. During the work conducted under the AOC, the former Lagoon 5 continued to be used as a storm water retention pond, collecting run-off which contacted preconditioned sludge for discharge to the POTW. Since the effective date of the AOC, ENSR sampled, obtained POTW approval, and discharged two batches of pond water, totaling approximately 2.96 million gallons.

Samples were collected in accordance with requirements set forth by the POTW as in previous events.

##### **Sludge Removal**

On August 12, 1996, ENSR mobilized to the site to begin final stabilization and verification testing activities under the AOC. ENSR began loading, transportation, and disposal of stabilized sludge which met delisting criteria in September 1996 and continued through December 1996. ENSR loaded for transport and disposal approximately 39,900 cubic yards of treated sludge.

## Schedule

All offsite disposal activities were completed by the deadline established by the AOC (subsequently extended), as described in the AOC final report.

## 6.0 CERTIFICATION

Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature Francis J. Macielak, Jr. Title Director EHS Date 5/13/97  
Francis J. Macielak, Jr.

Signature David Lazarov Title Pres Lazarov Bros. Date MAY-2-97  
David Lazarov

**Appendix A**  
**Analytical Results**

2 11 0085

Site: Sixty-One Industrial Park  
Break: 2.11

Please note: "On-Scene Coordinator Report – Volume I, Appendix A for Sixty-One Industrial Park Site, Memphis, Shelby County, Tennessee" has not been included with this Administrative Record. It is available in the Records Center, EPA Region 4, Atlanta, GA.